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San Francisco, California
1950

THE PAN-PACIFIC ENTOMOLOGIST

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Arrangements have been made for completing vol. 1, and for the publication of volumes 2 (applications in regard to nomenclatural problems), 3 (documents considered by the International Commission on Zoological Nomenclature at Paris, 1948), 4 (Official Record of the International Commission at Paris), and 5 (Official Record of the section on Nomenclature of the thirteenth International Congress of Zoology at Paris, 1948).

All inquiries regarding publications should be addressed to: International Trust for Zoological Nomenclature, 41 Queen's Gate, London, S. W. 7, England.

The Pan-Pacific Entomologist

Vol. XXVI, No. 2 April, 1950

DESCRIPTIONS OF NEW SPECIES OF STAGBEETLES FROM FORMOSA AND THE PHILIPPINES

(Coleoptera: Lucanidae)

BY BERNARD BENESH

North Chicago, Illinois

(Continued from last issue, p. 18)

Gnaphaloryx haddeni Benesh, new species

Figures 2, 2a, ♂

Male. Head transverse, twice as broad as long, nearly straight anteriorly; clypeus produced, tricusped; anterior angles obtuse, diverging diagonally to opposite the eyes; postocular section produced, but not attaining the width of the canthus, thence narrowing towards the base; face declivous; vertex produced into a conical, forward directed protuberance which is glabrous at apex; ocellate punctate throughout, each puncture bearing fasciculate brownish squamae. Eyes fairly large, incompletely divided by the canthus and postocular expansion, which are separated by a hiatus. Mandibles porrect, acute, gently arcuate, strongly keeled above from base to apical third, densely clothed with elongate squamae; flat below, with punctures which are distant and fasciculate; keel on right mandible terminated by a rounded tubercle, left keel gradually evanesces towards the apex; inner margin with a broad basal tooth, the midsection endentate and terminated by a broad tri-cuspid tooth, which on the left mandible has the anterior cusp rounded, the median smaller and acute, the basal larger, rounded and tuberculate on top; right mandible somewhat similar, with anterior and median cusps equal in size and rounded, the posterior largest and tuberculate. Antennae slender, black, opaque, scape as long as the funicle and clava together, funicular segments progressively diverging to front and covered with several rows of golden setae; clava tri-lamellate and shorter than the funiculus, the first and second segment lobate, the ultimate circular, flattened, pubescent.

Prothorax similar to that of *Aegus horridus*, with anterior margin less sinuate, sides more parallel, with two basal circular depressions, adjacent to the basal angles. Disk with a median, longitudinal depression, without distinct demarkation; punctured throughout like the head, each puncture bearing a tuft of squamae.

Scutellum twice as broad as long, apex broadly arcuate, densely squamose. Elytra reddish-brown, opaque, one and one-half times

as long as broad, humeri rectangular, sides parallel, apices regularly rounded, cribripunctate throughout, fasciculate, with sutural area and posterior declivity nearly nude.

Legs slender, punctured, squamose; anterior tibiae furcate apically, furcation glabrous and bent downward, outer margin tridentate, the intervals serrulate; intermediate and posterior tibiae armed with an obsolete median denticle; tarsi slender, shorter than the tibiae, finely setose.

Underside of silvery-gray aspect, punctured throughout, each puncture fasciculate. Mandibles shining. Mentum transverse, three times as broad as long, sides converging to apex, anterior margin broadly excised, antero-lateral angles arcuate; cribripunctate, squamose, strongly setose anterad. Subclypeus (epistoma) produced to a subtuberculate point, bent downward and fully enclosing the mentum in front. Prosternal process simple. Metasternum along the median line strongly impressed; trochanters posteriorly with tufts of yellowish-gray setiform squamae. Posterior margins of abdominal sterna emarginate, that of last sternum strongly setose.

Female. Unknown.

Measurements (in millimeters):

	Length	Width
Head	3.2	6.2
Mandibles: right	3.8	
left	4.0	
Prothorax	3.1	6.2
Elytra	8.9	6.1

Holotype: 1 ♂, KABASALAN, ZAMBOANGA, MINDANAO, PHILIPPINE ISLANDS, II, 1-18, 1932, Fred C. Hadden, Collector, in the Collection of the California Academy of Science (ex coll. F. C. Hadden).

Allied to *Gnaphaloryx squalidus* (Hope) and *G. tricuspis* Rits.; differing from *squalidus* in the disposition of the squamose vestiture, in that the mandibles are not broadened at middle and dentate, and in having a broader tricuspid clypeus (in *squalidus* the clypeus is narrower, truncate and tuberculate laterally); separated from *tricuspis* by the form of the clypeus (in *tricuspis* the central cusp is produced), mandibles (doubly bent in *tricuspis*) and prothorax (*tricuspis* distinctly narrowed or constricted in middle).

I take pleasure in naming this species after the collector, Mr. Fred C. Hadden of Santa Paula, Calif.

PLATE I: Figs. 1, 1a. Pronotum, head and mandibles of ♂, *Aegus horridus*. Figs. 2, 2a. Same, ♂ of *Gnaphaloryx haddeni*. Fig. 3. Same, ♂ of *Dorcus gracilicornis*. Fig. 4 Same, ♀ of *D. gracilicornis;* Fig. 4a. Elytron of *D. gracilicornis*. Fig. 5. Pronotum, head and mandible of ♂, *Dorcus clypeatus*. Figs. 6-9. Same parts *Figulus manillarum, F. fissicollis, F. orthognathus,* and *F. curvicornis*.

Genus NIGIDIUS MacLeay
Horea Ent., 1:108, 1819

NIGIDIUS LEWISI Boileau
Le Naturaliste, 27:61, 1905

Two examples taken by J. L. Gressitt on Hainan Island: Ta Han, VI, 23, 1935; Chung Kon, VII, 18, 1935.

Described by Boileau from the Loo choo (Ryukyu) Islands. The present record extends the range of the species several hundred miles closer to the Asiatic mainland. Identification by Dr. Gilbert J. Arrow.

NIGIDIUS LICHTENSTEINI Ritsema
Notes Leyden Museum, 1:129, 1879.

Described from Celebes and so recorded by Van Roon in the Junk-Schenckling's Catalogus Coleopterorum. New records noted here are from material collected at several Philippine localities by Mr. F. C. Hadden. The specimens are in the Collection of the California Academy of Science. Although all the localities here cited are from only one island — Luzon — the writer has seen examples in other collections from various islands of the Philippine archipelago.

Mabatobato Pili, Camarines Sur, Luzon, V, 16, 1931 (8 examples); Payambugan, Mountain Province, Luzon, VII, 9, 1931 (1 example); Mt. Makiling, Laguna, Luzon, elevation 400', V. 1, 1932; elevation 5,000 ft., VIII, 16, 1932, I, 16, 1932 (1 example each date noted).

Genus FIGULUS MacLeay
Horae Ent., 1:109, 1819.

Burmeister's statement[2] that in Lucanidae the antennae are always composed of ten segments certainly does not hold true in the Figulinae. In *Figulus* the number of segments varies from nine to ten, and in the variable *Penichrolucanus*, from seven to nine. Of the species of *Figulus* treated here, *manillarum* Hope and *fissicollis* Fairmaire have nine-segmented antennae, while *punctatostriatus* Deyrolle and the three new species described herein have ten-segmented antennae.

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[2]"Ihre Gliederzahl ist immer zehn." Handbuch der Entomologie, 5:305, 1847.

FIGULUS PUNCTATOSTRIATUS Deyrolle
Trans. Ent. Soc., London, p. 413, 1874.

Two examples from Garakayo, Palau Islands, VIII, 8, 1945, E. Hagen, in the Collection of the California Academy of Science.

Described from Timor, and also known to inhabit Larat; Kriesche[3] considered *punctatostriatus* to be a race of *confusus* Westwood. Identification by Dr. G. J. Arrow, British Museum (Nat. Hist.), London.

FIGULUS MANILLARUM Hope
Cat. Lucanoid Coleoptera, p. 26, 1845.

Nine examples from various localities in the Philippines: Alabang, Luzon, V, 29, 1929, ex coll. Van Dyke; Kabasalan, Zamboanga, Mindanao, V, 4, 1932; Mabatobato Pili, Camarines Sur, Luzon, V, 16, 1931; Mt. Makilling, Laguna, VI, 29, 1931; San Jose, Mindoro, IV, 1945, E. S. Ross; Tacloban, Leyte, XII, 1945, E. S. Ross.

F. manillarum occurs also on Guam, whence it was recorded by Zimmerman[4] as *F. lilliputanus* Westw.; the example upon which the Guam record was based, was examined by me through the kindness of Mr. O. H. Swezey, to whom thanks are here extended for helping to clarify a doubtful identification. Figure 6 represents a specimen of *manillarum* which Dr. Arrow compared with the type of *manillarum* in the Hopean Museum (Oxford) and pronounced typical. In so doing, Dr. Arrow discovered that the species previously identified at the British Museum as *manillarum* is entirely different; it is described herein under the specific name *curvicornis* (fig. 9).

FIGULUS FISSICOLLIS Fairmaire
Rev. Mag. Zool., 1:414, 1849.

Fifteen examples: Asingan, Pangasinan, V, 2, 1931, E. O. Sayos; Kabasalan, Zamboanga, V, 1, 1932; Mabatobato Pili, Camarines Sur, Luzon, V, 16, 1931, F. C. Hadden; Malabringo, Mt. Lobo, Batangas, VI, 1, 1932; Negros, P. L., 1,400′, ex coll. Van Dyke.

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[3]Stettiner Entomologische Zeitung, 83:183, 1922.

[4]Insects of Guam, Bull. 172, Bishop Museum, p. 218, 1942.

The preceding species and *fissicollis* are closely related, and at first glance appearing identical, but are readily separated when examined more closely. In *manillarum* the ocular canthus is emarginate behind the anterior angle, and its posterior edge is diagonal; in *fissicollis* the canthus is uniformly arcuate from the obtuse anterior angle and the posterior portion is nearly rectangular. Through correspondence with two of the foremost workers on Lucanidae in Europe, Dr. G. J. Arrow of London and Dr. R. Didier of Paris, it has been ascertained that the original description of *fissicollis* is erroneous and misleading; Fairmaire inadvertently described the mandibles as edentate, when in fact they are monodont. The species is also here recorded from Fiji, Gilbert Islands (ex coll. British Museum), Palau Islands, and Guam, the latter two localities based on material taken by Mr. Henry S. Dybas, Chicago Natural History Museum. A fine series of approximately seventy examples taken at various localities in Fiji, from the Bernice P. Bishop Museum, Honolulu, disclosed two synonymies. The most developed Fijian specimen of the species was recently described by Didier[5] under the name *monochromus*, whilst a like example from Palau Islands Kriesche[6] named *lupinus*. Although the pronotum is shown (fig. 7) without a frontal tubercle, larger examples have the pronotum elevated in front, tuberculate and laterally constricted, with two latero-marginal depressions on each side.

Figulus orthognathus Benesh, new species

Figure 8.

Black, nitid. Head transverse, broader than long (3.1 x 1.1 mm), straight anteriorly; antero-lateral angles obtuse, feebly emarginate to the canthus. Canthus broad, without a hiatus, completely dividing the eyes; anteriorly arcuate, obliquely diverging posteriorly to basal angles, the latter rounded, thence diagonally converging to posterior margin of the head. Clypeus produced, bilobate. Disk of head hollowed, delimited in front by two broadly spaced anteocular, and two more closely placed occipital tubercles. Head sparsely sculptured by small distant punctures, which are more pronounced and closer around the eyes. Mandibles porrect, externally slightly arcuate and rounded, upper surfaces laterally with a feeble ridge and shallowly canaliculate; right mandible with a single median tooth, the left mandible bidentate, with a

---

[5]Etudes sur les Coleopteres Lucanides du Globe, fasc. 7, p. 171, 1930.

[6]Stettiner Entomologische Zeitung, 83:131, 1922.

large median upper tooth and an anterior lower denticle. Antennae ten-segmented, of characteristic figuline aspect, cherry-red, with margins of clava and scape, darker, shining.

Prothorax longer than broad, convex, anterior margin gently sinuate, antero-lateral angles produced and obtusely arcuate, sides parallel, basal angles broadly arcuate, base nearly straight, feebly bisinuate; anterior declivous, tuberculate at middle; strongly punctured laterally; disk remotely punctured by fine, hardly discernible pin-point punctures, and with two latero-median and two latero-basal impressions.

Scutellum indistinct, wedge-shaped. Elytra parallel, nearly twice as long as broad (7.0 x 4.0 mm), narrower at base, humeri mucronate, apices regularly rounded; strongly tumulate and declivous, regularly punctato-striate by six, equi-distant striae, that attain the humerus; linearly punctured at side, the punctures ovate, shallow, interstices even; sutural stria outwardly bent on posterior declivity, second and third, and fourth and fifth striae incompletely united.

Legs short and stout. Anterior tibiae broadly furcate, with six marginal serrations which gradually diminish in size; intermediate tibiae trispinose, posterior tibiae bispinose in distal half.

Underside. Mentum slightly broader than long, sides sinuate, anterior margin feebly excised, antero-lateral angles rounded, basal margin straight; with two large, circular, closely placed pits, which are abreast of one another and whose interiors are finely granulate. Abdominal sterna sparsely punctured, their posterior margins emarginate. Length (mandibles included) 12.1 mm; width 4.1 mm.

Holotype: 1 example of undetermined sex, SANTA FE, BUKIDNON, *Alt.* 2,300 - 4,000 ft., MINDANAO, V, 15, 1935, ex coll. Van Dyke, in the Collection of the California Academy of Science.

Paratopotype: 1 example, in the collection of the writer.

Figulus foveatus Benesh, new species

In habitus resembling the preceding species, but with the following differentiating characters:

Disk of head closely ocellately punctate towards the base; clypeus less produced and less lobate; anteocular tubercles more prominent and closer to the eyes, basal or occipital tubercles more distant than in *orthognathus;* mandibles monodont. Pronotum broader than long, frontal tubercle more prominent and acute, disk with a median longitudinal punctate fovea, which has shallow basal impressions, somewhat resembling a clover leaf. Scutellum broader and canaliculate. Elytral interstices more convex. Underside more shining. Mentum more rugulose, pits not circular but ovate, and with smooth interiors. Metasternum with a median longitudinal, deeply impressed line. Posterior margins of abdominal sterna beset with short setae; abdominal sterna somewhat impressed laterally, the impressions pronounced on the terminal

segment. Length (mandibles included): 10.4 mm., width 4.00 mm.

Holotype: 1 example of undetermined sex, MT. PULAY, MOUNTAIN PROVINCE, 7,000 ft., VII, 6, 1931, ex coll. F. C. Hadden, in the Collection of the California Academy of Science.

Paratypes: 1 example, Mt. Makiling, Laguna, P. I., VIII, 9, 1931, in the collection of the California Academy of Science; 1 example, Mt. Pulay, Mountain Province, 7,000 ft., VII, 6, 1931, in the collection of the writer.

Figulus curvicornis Benesh, new species
Figure 9.

Head transverse, twice as broad as long (3.4 x 1.5 mm), black, front with a reddish tinge, emarginate alongside the clypeus, antero-lateral angles produced and obtuse, slightly emarginate anterior to the canthus; disk with a broad, somewhat diamond-shaped depression, ocellate punctate within, quadrituberculate, basal tubercles smaller than the anterior and further apart than in the two preceding species; front and canthus sparsely and finely punctured; clypeus produced, feebly bilobate; canthus broad, with anterior and basal angles arcuate, side of right canthus broadly rounded, on the left less so, the center inconspicuously emarginate; base of canthus diagonal, converging to base of head. Mandibles shorter than the head, strongly curved and in apical half upward bent, rounded laterally, obscurely keeled on top; right mandible unidentate, left bidentate, similar to that of *orthognathus*. Antennae as in the preceding species.

Prothorax broader than long (4.2 x 3.3 mm), somewhat flattened, anterior margin nearly straight, antero-lateral angles produced and broadly arcuate; sides parallel, feebly crenulate on basal half, basal angles broadly rounded, basal margin nearly straight; anteriorly elevated and feebly tuberculate at middle, disk impunctate, with a shallow, longitudinal, punctate fovea; anterior angles and sides closely punctured, punctures diminishing in size and intensity towards the disk.

Scutellum wedge-shaped, plain. Elytra more convex than the pronotum, one and one-half times as long as broad (6.7 x 4.1 mm); striation as in the preceding species, but more sharply defined, the punctuation more narrower or constricted, interstices impunctate, convex basally, flattened towards middle and posterior.

Legs short and robust; anterior tibiae keeled above, furcate, outer margin tridentate in distal half, the rest to geniculation roughly serrate; intermediate and posterior tibiae unispinose, this however may vary, as the left intermediate tibia shows indication of another smaller spine above the regular media spine; tarsi shorter than the tibiae, glabrous on top, with one or two setae on the first and fourth segment.

Underside. Mentum broader than long (1.2 x 0.9 mm); anterior margin concave, sides rounded, base straight; roughly sculptured, with a transverse pit, which is deeper laterally and punctured basally. Lacinial brush or comb curved and directed inwardly, not pointing forward as in most lucanids, apical setae forming a distinct hook, resembling somewhat a digitus. Front of prosternum and sides of metasternum fairly closely punctured by medium size punctures. Femora finely punctured. Punctuation of abdominal segments distant, closer on apical segment. Length (mandibles included) 11.8 mm; width 4.2 mm.

Holotype: 1 example of undetermined sex, Mt. Makiling, Laguna, P. I., VIII, 9, 1931, V. Madrid, collector, in the Collection of the California Academy of Science.

Paratypes: 1 example, Mabatobato Pili, Camarines Sur, V, 16, 1931, in the collection of B. Benesh (ex coll. F. C. Hadden); 2 examples, Marikima, Rizal Province, Luzon, P. I., June 1946, Dr. Wm. Rose, collector, in the Chicago Natural History Museum.

This description was originally based on two examples from the collection of the California Academy of Science that were labelled *laticollis* Reiche; subsequently two additional examples, without determination, were discovered in the Chicago Natural History Museum. As far as is known to the writer *F. laticollis* is a *nomen nudum*, no description of the insect being extant. Through diligent research it was discovered that the name *laticollis* first appeared in entomological literature in Dejean's Catalogue des Coleopteres, 3rd edition, p. 194, being credited to Eschscholtz; Reiche[7] alluded to *laticollis* in his criticism of Burmeister's Handbuch der Entomologie, without describing the insect, hence any reference to Reiche's name as being the protologist of the species is positively erroneous. It appears again in the Thomson's Catalogus[8] wherein Eschscholtz is given as the originator of the name; the last record of the name appears in Miwa's Catalogus Coleopterorum Japonicorum, Pars 2, p. 11, 1936, where the purported *laticollis* is recorded from Kotosho, Formosa. Dr. Arrow, who reviewed the specimens from the California Academy of Science, stated that the British Museum has four examples of *curvicornis*, which were identified by the late Chas. O. Waterhouse as *manillarum*, corrected subsequently by Arrow after comparison of examples of *manillarum* from the collection of the writer.

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[7]Ann. Soc. Ent. France (3) 1:84, 1853.

[8]Ann. Soc. Ent. France (4) 2:402, 1862.

Book Notice

American Spiders, by Willis J. Gertsch. D. Van Nostrand Company, Inc., New York, N. Y., xiii + 285 pages, 1949. $6.95.

This is a book by an eminent authority in the field of spider lore. In it he has presented an accurate and extremely interesting general background of information on the spiders of the temperate American region. The book is capably written and largely popularized, although at times the uninitiated will be puzzled by the terminology used. A short glossary aids in clarifying the text.

The most outstanding feature of the book is its voluminous series of color plus black and white photographic reproductions of spiders and their works. The excellence of these plates alone would make the work a valuable possession not only for the libraries of those professionally interested in the field of Araneology but perhaps even more so for the non-professional.

In following the frequent text references to the illustrations, one could wish that the plates had been arranged in a single section or that a single system of numbering both types of plates as well as figures had been used.

The average reader will recognize in the revealing plates and descriptions many of the spiders he has seen in his own environment and will at the same time understand more fully the natural history of the species. Although the title is "American Spiders", the author has wisely included forms not represented in the American fauna where such inclusions seemed to provide better insight into the interrelationships of spiders as a whole.

The reader will find answers to varied types of questions such as: How did spiders evolve and when? Of what economic use are spiders? How long do spiders live? What are the mating habits of spiders? Are spiders commonly poisonous? What role does silk spinning play in the lives of the various spider groups?

The author has given a brief but clear account of the medical importance of spiders, in which is exploded the popular myth about the venomous nature of most spiders to man. The known species dangerous to man are considered. Among these the truly venomous endowment of the black widow spider is emphasized together with a description of symptoms following the bite and

the status of present-day treatment. Naturalistic control methods of this species are briefly discussed; however, the subject of chemical control is only mentioned.

As an informative, well illustrated and interesting account of the American spiders the book is highly recommended.—DEANE P. FURMAN.

CLAUDE "I" SMITH
1922 - 1949

With the tragic loss of Claude "I" Smith on November 4, 1949, entomology has been deprived of a very promising lepidopterist and insect biologist. Claude was born January 13, 1922, in Chicago, Illinois. He moved a year later with his family to Los Angeles, California where, in the following years, he attended the San Pasqual Grammar School, the Luther Burbank Junior High School, and the Benjamin Franklin High School.

At the age of three, Claude made the acquaintance of an elderly butterfly collector who furthered the interest in entomology which had first become manifest during family camping trips. Under the guidance of this gentleman, Claude began his first collection of Lepidoptera. That his early interests in insects were not entirely confined to dried specimens may be seen in his attempt at the age of four to biologically control aphids. His mother had mentioned the relationship existing between aphids and ladybird beetles whereupon Claude mass collected the beetles and transferred them to aphid infested plants.

While in high school he became close friends with Frank Sala, also a student, and Chris Henne, a professional collector and owner of a large collection of Lepidoptera. This association led to Claude's membership in the Lorquin Natural History Club of the Los Angeles County Museum, which through his active participation heightened his interests in entomology. Frequent collecting trips were made with these and other collectors which resulted in the formation of a large and excellent collection of Lepidoptera.

Upon his graduation from high school and with the advent of the war his formal education was interrupted and he sought employment in the aircraft industry. In October of 1942 he entered

the service of the United States Navy and saw action in the British Solomon Islands. He was discharged in 1945 and resumed his studies at Los Angeles City College in 1946 where he began to major in entomology. Claude transferred to the Berkeley Campus of the University of California in the fall of 1948 and was completing his Bachelor of Science degree in entomology, which has since been conferred posthumously, when the untimely accident occurred.

In addition to meeting the requirements of the degree, Claude was engaged in a revisionary study of the Phalaenid (=Noctuid) genus *Annaphila*, and was conducting breeding experiments in the hope of obtaining collateral information for defining the levels of speciation of these moths, a study which is being completed by Dr. F. H. Rindge of the American Museum of Natural History. Also he was greatly interested in host-parasite relationships, particularly of the Lepidoptera, and was accumulating for publication such records secured by him in the rearing of parasitized material.

Claude is survived by his wife Ida, two sons, Mikael and Rodney, and his mother, Mrs. Laura Smith. Through the generosity of his wife, Claude's entire collection was presented to the University of California where it forms a very important part of the Division of Entomology and Parasitology collection of Lepidoptera and stands as a memorial of his contribution to science.—PAUL D. HURD, JR.

SYNANTHEDON SAXIFRAGAE IN CALIFORNIA

Among some Aegeriids collected in the Sierra Nevada by C. D. MacNeill of the University of California, was a perfect female of *Synanthedon saxifragae* (Hy. Edwards). The specimen was taken in flight, June 28, 1948, at China Flat, (Silver Fork of the American River, 5400 feet), Eldorado County, California.

Engelhardt[1] gives the distribution of *S. saxifragae* as "Rocky Mountains, Colorado, and Utah, 8,000 to 12,000 feet, Alaska, Labrador, and Hudson Bay." He mentions that only a few worn specimens have been taken to date in separated sections of the continent, all at high elevations or in Arctic regions. There are no published records of this species in the United States west of Utah.—CLAUDE I. SMITH.

[1]Englehardt, Bull. U. S. Nat. Mus., 190:98, 1949.

NOTES ON CANTHARIS III

(Coleoptera, Cantharidae)

BY DOROTHY MC KEY-FENDER

McMinnville, Oregon

(Continued from last issue, p. 33)

CANTHARIS (CULTELLUNGUIS) AMERICANA LARVALIS LEC.

Telephorus larvalis Leconte, 1860, U.S.P.R.R. Exp. and surveys, Zool., 47th parallel, Coleoptera, p. 48.

This subspecies differs from the typical in its paler coloration. Elytra testaceous or dusky, margins piceous, short elytral pubescence flavous or luteous, erect hairs dusky to piceous, head and pronotal spots brunneous to black. Otherwise as in the typical form. Specimens examined: 48.

This pale form is northern in distribution, specimens of *americana* from Washington, Oregon and Northern California consistently being of this subspecies. The San Francisco Bay region appears to be where its distribution overlaps that of the typical form. Specimens from Marin county at hand all belong to this subspecies while some of the Santa Cruz and San Mateo county material is typical and some of the subspecies *larvalis*. South of San Francisco in the Monterey region a similar but distinct subspecies is found:

Cantharis (Cultellunguis) americana montereyensis McKey-Fender, n. subsp.

Elytra usually lighter than in the typical form, testaceous or dusky (piceous in one specimen), margined with piceous; legs testaceous with tarsi infuscate as in the typical form, but knees black, otherwise as in the typical form.

Range: California, Monterey county.

Holotype: male, CARMEL, MONTEREY CO., CALIFORNIA, June 15, 1915, L. S. Slevin [Calif. Acad. Sci.].

Allotype: female, Carmel, Monterey Co., May 12, 1911, L. S. Slevin [Calif. Acad. Sci.].

Paratypes: 6 males, 9 females. Monterey Co., June 24, 1941, D. J. and J. N. Knull, 2 specs.; Carmel, Monterey Co., May 10 to June 9, 1908, L. S. Slevin, 9 specs.; Carmel, August 5, 1923,

L. S. Slevin, 1 spec.; Monterey, June 21, 1898, A. Fenyes, 1 spec.; Pacific Grove, June 5-8, 1904, 4 specs.

The diagnostic feature of this subspecies is the black knees. All the specimens of this species at hand from Monterey and Carmel show this character and it appears in no other specimens of this species yet examined. All the types have the elytra testaceous or dusky as in *larvalis* except one, which has the elytra piceous as in the typical form. The types were collected in a rather restricted locality, but over a period of forty-three years.

Cantharis (Cultellunguis) hatchi McKey-Fender, n. sp.

Elytra piceous, head, pro-thorax and scutellum flavous, basal segment of antennae flavous with apex black, remainder of antennal segments testaceous to dusky; legs flavous with knees black, tarsi often testaceous; ventral surface of head, pro- and mesosternum flavous, metasternum and medial portion of abdominal sternites piceous or brunneous, the latter bordered laterally and apically with flavous. Form slender.

Male: Width at base of elytra 2 mm., length 8.5 mm., antennae 6.5 mm. Clypeas moderately long (for this group), emarginate, evenly arcuate on either side. Antennae exceeding two-thirds of body length, eyes large. Thorax subquadrate, a little longer than wide, anterior angles prominent, obtuse, anterior edge evenly, shal-

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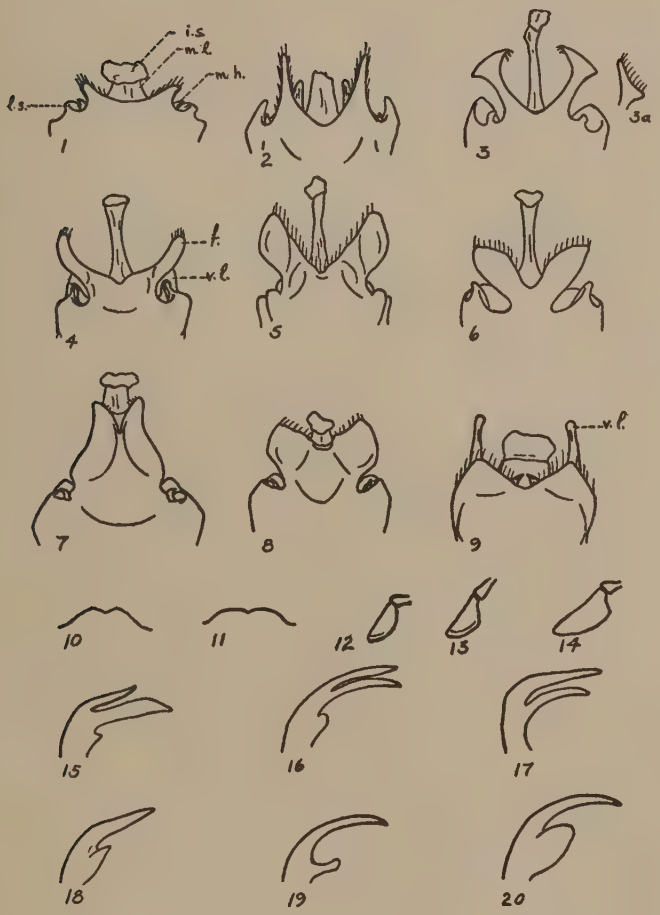
Plate Legend

Figs. 1-8. Dorsal view of tip of aedeagus of *Cultellunguis* spp.: l.s.—lateral sinuations; i.s.—internal sac; m.l.—median lobe; m.h.—median hook; f.—bifurcation of dorsal plate of tegmen; v.l.—ventral lobe. (All drawn to approximately the same scale.) 1. *americana*, 2. *hatchi*, 3. *macnabiana*, 3a. detail of tip of fork of *macnabiana*, 4. *mackenziei*, 5. *ochropa*, 6. *perpallens*, 7. *ingenua*, 8. *ingenua knulli*. Fig. 9 same of *Absidia sierrae* (magnification relatively greater than Figs. 1-8). Fig. 10. Anterior edge of clypeus of *Cultellunguis macnabiana*. Fig. 11. same of *C. ochropa*. Figs. 12-14. Last two segments of maxillary palpi: 12. *Absidia insipida?*, 13. *Cantharis* sp. *oregona* complex, 14. *Cultellunguis americana*. Figs. 15-20. Types of claws: 15. *Cultellunguis*, anterior protarsal claw of males, drawn from *americana;* 16. *Cyrtomoptera*, characteristic of anterior claws of all feet, drawn from *divisa* (basal tooth less developed in *dentata*); 17. *Carolina* group, characteristic of all claws, drawn from *carolina;* 18. *Ancistronycha*, drawn from anterior claws of *bilineata*; 19. *Cantharis* (*s. str.*), a bluntly toothed type, drawn from anterior protarsal claw of female, same species as Fig. 13; 20. *Cantharis* s. str.; lamellate type, drawn from anterior protarsal claw of male of same species as Fig. 13.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lowly convex from the anterior angles; sides sub-parallel slightly constricted just behind anterior angles; slightly narrowed posteriorly, posterior angles distinct, a little over a right angle, posterior margin very shallowly convex, slightly sinuate; edges of prothorax reflexed, disc with a broadly concave area anteriorly over one-fourth of width of thorax on each side and tapering postero-laterally to nothing at about the posterior fourth or fifth, edge uniformly reflexed, disc tumid on each side posteriorly leaving a shallow median depression. Elytra slender, length three times combined width; longitudinal sculptured lines apparent; short pubescence cinereous, erect hairs dusky testaceous to brunneous. Anterior claw of protarsi cleft, the outer cleft portion cultellate, the two parts of equal length; all others simple. First protarsal segment expanded, width equals two-thirds its length, second and third segments equal one-half the width of the first, width of the second segment equals two-thirds its length, width of third segment equals four-fifths its length. Metacoxae with a posteriorly directed conical projection on ventral surface. Posterior margin of last sternite simple.

Male genital armature testaceous, dorsal forks of tegmen moderate in length, slender, acute, posteriorly directed, scarcely divergent; lateral sinuations pronounced, broadly lobular; median lobe short, moderately stout, shorter than the dorsal forks; tips of ventral lobes produced, compressed in a slightly more lateral plane than basal part, moderately long (Fig. 2).

Female: Differs in its relatively more robust form, smaller eyes, shorter antennae, basal protarsal segment not expanded, claws all simple, and the conical projection of the metacoxae lacking; width 2 mm., length 8 mm., antennae 5 mm.

Range: California: Coastal counties and offshore islands, San Jacinto Mts. north to Monterey.

Holotype: male, KEEN CAMP, RIVERSIDE CO., CALIFORNIA, June 6-12, 1917, E. P. Van Duzee [Calif. Acad. Sci.].

Allotype: female, same data [Calif. Acad. Sci.].

Paratypes: 8 males, 14 females; Cuyamaca Rancho State Park, May 19, 1941, D. J. and J. N. Knull, 1 spec.; Oak Grove, June 5, 1941, D. J. and J. N. Knull, 1 spec.; Arroyo Seco, July, 1937, 1 spec.; Mt. Wilson, May 29, 1947, June 7, 1941, G. P. Mackenzie, 4 spec.; Keen Camp, May 24-June 14, 1946, D. J. and J. N. Knull, 10 specs.; Frazier Mt., Ventura Co., May 20, 1919, Hopping, 4 specs.; S. Madre, June, A. Fenyes, 1 spec.; Keen Camp, Riverside Co., June 6-12, 1917, E. P. Van Duzee, 4 specs.; Waterman Canyon, May 27, 1916, 8, v, 1 spec.; Bryson, April 24, 1917, white oak, 1 spec.; Lytle Creek, San Bernardino Co., June 7, 8,

1928, Van Dyke, 2 specs; Forest Home, San Bernardino Co., June 14, 1928, Van Dyke, 2 specs.; Santa Cruz Island, May 17, 1919, E. P. Van Duzee, 1 spec.; Catalina Island, May, No. 91 and 92, A. Fenyes, each pin bearing also a yellow disc, 2 specs. (these specimens atypical).

The two specimens from Catalina Island, both female, differ from the typical in having elytra and antennae entirely testaceous. It is very likely these represent a good subspecies, but until more specimens are available for study it seems unwise to give it a name. This species, both male and female, is readily distinguishable from *C. americana montereyensis* which it most closely resembles by the more slender form and uniformly yellow head and thorax (maculate in *americana*). The best single diagnostic characteristic is the peculiar conical projection on the male metacoxae. This is the only *Cantharis* showing this structure known to the author. It differs from *perpallens* in its bicolored legs (uniformly pale in *perpallens*) and in the distinct pronotal angles (anterior angles not evident in *perpallens*). The conformation of the male genital armature places this species nearest *C. americana.*

This distinctive species is named in honor of Dr. Melville H. Hatch, whose suggestions in regard to this study are sincerely appreciated.

Cantharis (Cultellunguis) macnabiana McKey-Fender, n. sp.

Elytra, prosternum and posterior part of head black or piceous, front of head from a little before the center of the eyes, prothorax, base of antennae, scutellum and legs rufo-testaceous; antennae otherwise piceous, tarsi infuscate, meso- and metasternum and venter piceous. Form moderately slender.

Male: Width at base of elytra 2 mm., length 8.75 mm., antennae 6.25 mm. Clypeus short, with a distinct triangular median notch, margin oblique either side. Antennae attaining two-thirds of the body length, eyes large. Pronotum subquadrate, anterior angles present but very broadly obtuse and the anterior edge moderately convex from the anterior angles; sides subparallel, slightly narrowed posteriorly; posterior angles distinct, a little over a right angle, posterior margin shallowly convex, sinuate, edges of pronotum reflexed, disc with a broadly concave area at anterior angles occupying one-fifth of width on each side and tapering posteriorly, leaving a thin margin at posterior fourth which joins the reflexed portion of the posterior margin; posterior margin uniformly reflexed, disc tumid either side posteriorly, a wide, shallow median

depression extending anteriorly nearly to the anterior margin. Elytra slender, length equaling or slightly exceeding three times combined width, longitudinal sculptured lines moderately strong, short pubescence cinereous, erect hairs black. Anterior claw of protarsi cleft, outer cleft portion cultellate, slightly exceeding the inner, apex obliquely truncate internally, all others simple. First tarsal segment broadly expanded, width equals two-thirds its length, width of second equals three-fourths its length which equals the width of the first; width of the third equals its length which equals the width of the second. Posterior margin of last ventral simple.

Lobes of dorsal bifurcation of tegmen slender, widely separated, tips securiform; lateral sinuations short, acutely pyramidal; median lobe slender, long-exserted; ventral lobes dorso-ventrally compressed, secondarily lobed apically, lobe directed mesad (Fig. 3).

Female: Differs in stouter form, smaller eyes, shorter antennae, claws all simple, protarsi not expanded. Width at base of elytra 2.25 mm., length 8.25 mm., antennae 5.75 mm.

Range: California; San Diego County.

Holotype: male, San Diego, California, May 10, 1914, E. P. Van Duzee [Calif. Acad. Sci.].

Allotype: female, same data [Calif. Acad. Sci.].

Paratypes: 8 males, 4 females; San Diego, May 10, 1914, E. P. Van Duzee, 4 specs.; San Diego, April 24, 1920, W. M. Giffard, 1 spec.; San Diego, C. N. Sanford, 1 spec.; San Diego Co., F. E. Blaisdell, 5 specs.

This species is named in honor of Dr. Jas. A. Macnab, one of those all too rare individuals, a really inspiring teacher.

Very like *ochropa* (v. sub.) but slightly more robust, usually darker, the pronotum wider rather than narrower anteriorly, the clypeus strongly notched (biarcuate in *ochropa*) and differs in the male abdomen and genitalia. The possibility that *lauta* 1851 could be the female of this species cannot be completely discounted, but available evidence indicates it is not.

Cantharis (Cultellunguis) lauta Lec.

Telephorus lautus Leconte, 1851, Synopsis of the Lampyrides of Temperate N. America; Proc. Ac. N. S. Phila. (2) 5: 340.
non T. lautus Leconte, 1881, Synopsis of the Lampyridae of the United States, Trans. Am. Ent. Soc. 9: 54.

In his 1851 paper, Leconte described *Telephorus lautus* from a single specimen as follows:

"T. lautus Lec., niger, cinero-pubescens, ore pedibus thoraceque laete flavis, hoc quadrato, antrorsum subangustato, undique angusto marginato, elytris scabris, substriatis. Long. .3. San Francisco, Calif."

In between 1851 and 1881 when he published his synopsis of the U. S. Lampyridae, he associated a number of specimens with the 1851 type and evidently drew up his 1881 characterization from these specimens, representatives of a black-legged species, since his 1881 description reads:

"Black, head in front of the eyes, prothorax, sides and apex of abdomen yellow. Length 7-10 mm.; Cal."

The type series of *lauta* as it stands at present consists of a complex, mostly the dark-legged species referred to above, and which has recently been described by this author as *Cantharis* (*Cyrtomotera*) *dentata* McKey-Fender (1944). Fall (1936) also recognized that this was a different species. In his next key point in the 1881 paper (p. 54) Leconte described as new a species, *T. ochropus,* which he characterized only as:

"Similar to lautus but legs also ferruginous, length 9 mm., Cal., San Diego (Bolter)."

This inadequate description differentiates *ochropa* only from *lauta* as construed in the 1881 synopsis, not from the original (1851) description. According to C. A. Frost, the type of *lauta*—i.e., the first specimen in Leconte's series, a female, has the tip of the abdomen pale, resembling *ochropa* (in litt.), and the pronotum of *lauta* is stated to be narrowed anteriorly, as is that of *ochropa;* thus eventually *ochropa* may prove to be the male of *lauta.* For the present, however, the name *lauta* is applied only to the 1851 type female. If the type *lauta* can be shown to agree with the female *ochropa,* particularly in the shape of the clypeus which appears to be diagnostic, the name *ochropa* will have to be suppressed in its favor, a step which the author does not wish to take, however, without further study of the type *lauta.*

Cantharis (Cultellunguis) ochropa Lec.

Telephorus ochropus Leconte, 1881, Synopsis of the Lampyridae of the U. S., Trans. Am. Ent. Soc., 9: 54.

Elytra piceous, head from a little before center of eyes, prothorax, scutellum and legs flavous; basal segment of antennae flavo-testaceous, apical segments piceous; sides and apex of abdomen dusky testaceous, ventral surface otherwise piceous, head black behind center of eyes. Form moderately slender.

Male: Width at base of elytra 2 mm., antennae 6 mm., length 8.75 mm. Clypeus rather short, scarcely emarginate or merely slightly flattened at center, shallowly arcuate on each side (Fig. 11); antennae attaining two-thirds of body length; eyes large. Pronotum subquadrate, anterior angles very broadly obtuse and anterior margin moderately arcuate from the anterior angles; sides subparallel, slightly narrowed anteriorly; posterior angles distinct, a little over a right angle; posterior edge sinuate, broadly indented medially; anterior and posterior edges reflexed, disc with a broadly concave area on each side anteriorly over one-fifth of width of thorax on each side and tapering laterally to about posterior third; posterior edge uniformly reflexed. Elytra slender, combined width approximately one-third length, longitudinal sculptured lines faintly evident, short pubescence cinereous, erect hairs piceous. Anterior claw of protarsi cleft, the outer cleft portion cultellate, longer than the inner, apex obliquely truncate; all others simple; first protarsal segment only slightly expanded, width a little less than one-half length, second segment a little narrower, width equaling four-fifths of its length which equals width of first segment. Posterior margin of last sternite deeply, broadly emarginate, floor of the margination sinuate, the sides apically produced, the edges of the produced portion flattened.

Lobes of dorsal bifurcation of tegmen broadly rounded, incurved, inner surface clothed with long pubescence, median lobe slender, long-exserted, ventral lobes dorso-ventrally flattened, moderately short, slightly exceeding lateral sinuations of dorsal plate when viewed laterally, secondary lobe on apical third internally, lateral sinuations short, a blunt lobe (Fig. 5).

Female: Eyes relatively smaller than those of male, form a little stouter, width at base of elytra 2.25 mm., length 8.75 mm., antennae 5.5 mm., sides and apex of abdomen dusky testaceous, or testaceous color restricted to tip, claws simple, protarsi not expanded.

Range: Southern California, type Santa Monica; all those examined by the author, San Diego county.

Homeotype-plesiotype: male, San Diego, California, June 6, 1914, E. P. Van Duzee. [Calif. Acad. Sci.] This specimen was compared with the unique male type of *ochropa* and the diagnostic abdominal characteristics found to agree. Comparison was made by Dr. P. J. Darlington, Jr., whose assistance is sincerely appreciated.

Other specimens examined: 2 males, 11 females, San Diego, Mission Valley, May 1, 1928, on *Lonicera*, Geo. Smith 1 spec.; San Diego, F. E. Blaisdell, 3 spec.; San Diego, C. N. Sanford, 1 spec.; S. Cal. (no further data, but contemporary with the following), 4 specs.; Smith's Springs, S. Cal., 3300 ft., April 19, 1879, 1 spec.; San Diego, April 23, 1879, 3 specs.

This species is rare—at least in collections.

Cantharis (Cultellunguis) mackenziei McKey-Fender, n. sp.

Elytra black, head before middle of the eyes, pronotum and scutellum flavous, antennae black except anterior surface of the first two segments testaceous shading to brunneous apically; legs black except procoxae testaceous, profemora brunneous basally and meso-coxae brunneous; prosternum testaceous, mesosternum brunneous and metatsternum and abdomen black. Form slender.

Male: Width at base of elytra 2 mm., length 8.5 mm., antennae 6.5 mm. Clypeas short, emarginate, margin gently oblique on either side; antennae exceeding two-thirds of body length; eyes large. Thorax subquadrate, a little longer than wide, narrowed anteriorly; anterior angles broadly obtuse, evenly rounded into the shallowly convex anterior edge, sides slightly sinuate, widest at middle, posterior angles distinct, a little over a right angle, posterior edge gently convex, sinuate; edges of pronotum reflexed, disc with a broadly concave area occupying the anterior third on each side, narrowing postero-laterally to the posterior fourth, posterior edge uniformly reflexed, disc tumid on either side posteriorly, a shallow median depression extending to the anterior third. Elytra slender, length nearly three times combined width, sculptured lines scarcely evident, short pubescence cinereous, erect hairs golden or fulvous (brunneous in one specimen), never black. Anterior claw of protarsi cleft, the outer cleft portion cultellate, exceeding the inner, rounded at extreme tip, oblique internally, all others simple. First protarsal segment slightly expanded, width equals one-half its length; length of the second equals width of the first, width of the second equals half its length, length of third equals width of the second, width of third equals half its length. Posterior edge of seventh sternite deeply emarginate, floor of the emargination sinuate, sides produced postero-laterally and expanded apically, a raised ridge extending anteriorly from the produced sides parabolically across the lateral part of the last segment to the center of the sixth visible (next to the last visible) segment.

Dorsal bifurcation of tegmen moderately long, lobes slender, rounded at tips, tips widely separated, projecting diagonally downward and backward, ventral lobes dorso-ventrally flattened, long, secondary lobe near tip, directed mesad, median lobe slender, long-exserted, lateral sinuations prominent, narrowly lobular (Fig. 4).

Female: Stouter than male, antennae shorter; width at base of elytra 2.5 mm., length 9 mm., antennae 5.75 mm.; all claws simple; protarsi not expanded.

Range: California; San Bernardino National Forest (L. Arrowhead and San Jacinto Mts.)

Holotype: male, L. ARROWHEAD, CALIFORNIA, July 3, 1941, G. P. Mackenzie [Calif. Acad. Sci.].

Allotype: female, same data [Calif. Acad. Sci.].

Paratypes: 22 males, 25 females. Forest Home, San Bernardino Co., June 14, 1928, 9 specs., June 15, 1928, 3 specs., June 10, 1926, Van Dyke, 1 spec.; Tahquitz Cn., Riverside Co., June 30, 1928, Van Dyke, 1 spec.; Idyllwild, July 3, 1928, June 21, 1940, Van Dyke, 5 specs.; San Jacinto Mts., 1932, F. E. Winters, 1 spec.; Santa Rosa Mt., San Jacinto Mts., May 31, 1940, *Quercus* Fred H. Rindge, 1 spec.; June 15, 1946, D. J. and J. N. Knull, 1 spec.; L. Arrowhead, July 3-5, 1941, July 11, 1942, July 23, 1944, July 2-6, 1945, G. P. Mackenzie, 34 specs.

This species very closely resembles *C. ingenua* but the elytral pubescence distinguishes it even from *C. ingenua knulli*, which it most closely resembles, the erect hairs of the elytra being golden or fulvous (invariably black in *ingenua*). Males may also be separated by the deeply emarginate last ventral segment (very shallowly emarginate in *ingenua*). This character, though difficult to express in words is very striking. *C. ochropa* has the terminal sternites similarly modified, though less strongly. The male protarsi are not very broad, thus differing from typical *ingenua*, though not from *ingenua knulli*. The male genital armature indicates a relationship to both *ingenua* and *ochropa*, that of *ingenua* being a more expanded development of the same plan as the other two species.

The author is pleased to name this fine species after Mr. G. P. Mackenzie, through whose efforts most of the extensive type series was obtained.

CANTHARIS (CULTELLUNGUIS) INGENUA LEC.

Telephorus ingenuus Leconte, 1881, Synopsis of the Lampyridae of the United States, Trans. Am. Ent. Soc., 9: 55.

Black except head before eyes and pronotum flavous to rufotestaceous, prosternum and anterior surface of first and second antennal segments brunneous. Form relatively robust.

Male: Width at base of elytra 2.25 mm., length 9 mm., antennae 6 mm. Clypeus short, shallowly emarginate apically, evenly arcuate on either side, antennae appreciably less than two-thirds

of body length; eyes moderate in size. Pronotum subquadrate, a little longer than wide, slightly narrowed anteriorly; anterior angles evident, broadly rounded into the moderately convex anterior margin, sides nearly straight, posterior angles distinct, a little over a right angle, posterior margin sinuate, shallowly convex, disc broadly concave either side before the middle tapering to sides at posterior one-third, posterior margin uniformly reflexed; disc tumid on either side posteriorly, a shallow median depression extending anteriorly to anterior one-fifth. Elytra moderately slender, combined width approximately one-third length, longitudinal sculptured lines faint, short pubescence cinereous, erect hairs black. Anterior claw of protarsi cleft, the outer cleft portion cultellate, slightly exceeding the inner, obliquely arcuate internally; all others simple. First protarsal segment long and broadly expanded, width equaling nearly three-quarters of the length; width of second equals its length which equals one-third the length of the first; width of the third equals one and one-fourth times its length and equals the length of the second. Posterior margin of seventh sternite broadly, very shallowly emarginate, the floor of the emargination very slightly convex medially, a slightly swollen ridge extending a short distance from the prolonged sides anteromedially.

Male genital armature black; entire structure broadly expanded, in the dried specimens, crumpled, dorsal bifurcation of tegmen very broad, investing tip of median lobe, lateral sinuations uncomplicated, median lobe moderately stout basally, slender apically, ventral lobes dorso-ventrally compressed, short, broad, secondarily lobed internally, lobe small, nearly apical (Fig. 7).

Female: Stouter, width 2.5 mm., length 9.25 mm., antennae 6 mm., all claws simple, protarsi not expanded.

Range: California; Western Riverside Co., north to San Francisco (typical). The type is said to be from Nevada.

Specimens examined; 60.

Homeo-plesiotype: male, Belvedere, California, May, 1937 [Calif. Acad. Sci.].

This specimen was compared with the Leconte type of *T. ingenuus* by Dr. P. J. Darlington, Jr.

C. ingenua is the darkest of this group of *Cantharis*. The black elytral pubescence distinguishes both sexes readily from *C. mackenziei*, its nearest relative. Typically the male first protarsal segment is very broad and long and the succeeding segments are also very wide. A subspecies lacking the broadened protarsi and differing in certain other respects is described below:

Cantharis (Cultellunguis) ingenua knulli McKey-Fender, n. subsp.

Smaller and form more slender than typical; width of male 1.75 mm., length 6.5 mm., antennae 5 mm.; female a little stouter than male. Color as in the typical form except scutellum, prosternum and procoxae also flavous, tegmen brunneous rather than black, less strongly chitinized, lobes of dorsal plate not strongly expanded and not collapsed; median lobe slender, more of its length exposed than in typical form (Fig. 8). First protarsal segment of male not at all expanded in dried specimens and only slightly so even in relaxed, moist specimens.
so even in relaxed, moist specimens.

Holotype: male, JACUMBA, CALIFORNIA, May 18, 1941, D. J. and J. N. Knull [Ohio State University].

Allotype: female, same data [Ohio State University].

Paratypes: 8 males, 6 females, Jacumba, May 18, 1941, D. J. and J. N. Knull, 7 specs.; Cuyamaca Rancho State Park, May 19, 1941, D. J. and J. N. Knull, 1 spec.; Oak Grove, June 5, 1941, D. J. and J. N. Knull, 2 specs.; Banning, May 20, 1941, Van Dyke, 4 specs.

Collected at several points in the Cleveland National Forest area of southern California, all of these specimens fitting the above analysis very closely. Specimens from Whittier, Alhambra, and Corona approach this form in coloration, the scutellum and prosternum being light and the genital apparatus paler and somewhat less strongly expanded than in specimens from other Los Angeles area localities and the San Francisco Bay region, but with the robust form and broadly expanded male protarsal segment of male not at all expanded in dried specimens and only slightly so even in relaxed, moist specimens.

Unlike the other variants of the species of *Cultellunguis*, *knulli* departs from the typical not so much in pigmentation as in degree of development of certain structures. In the opinion of the author, it is of subspecific rank, the restricted geographic range strengthening this view. The male genital armature differs from the typical only in the parts being less broadened.

CANTHARIS (CULTELLUNGUIS) PERPALLENS FALL

Cantharis perpallens Fall, 1936, On certain species of *Cantharis* (*Telephorus*), Pan. Pac. Ent., 22: 179.

The original description of this insect is readily accessible and quite complete, therefore it will not be redescribed. The characters included in the key and figures of this study should serve to separate it. The shape of the pronotum is very distinctive, the an-

terior margin being more strongly convex than in any of the species and the anterior angles obliterated.

The male genital armature is undescribed: Lobes of dorsal bifurcation of tegmen moderately broad, wider at tip than base, divergent, tips not appreciably curved downward, lateral sinuations pronounced, acutely pyramidal; ventral lobes dorso-ventrally flattened, short, secondarily lobed at tips internally; median lobe slender, long-exserted (Fig. 6).

Range: California west of the Sierras, north to Monterey and south to Baja California, Mexico (Ensanada and Catavina).

The single specimen from Catavina, like the typical form, is very pale and slender, but differs in having a faint brunneous M-shaped pronotal maculation.

Cantharis (Cultellunguis) perpallens sanctaeclarae McKey-Fender, n. subsp.

Although the pale coloration of *perpallens* has been considered one of the more important diagnostic characters, specimens from some localities represent a melanic subspecies: Elytra black, piceous or brunneous and the underparts dark; a dark occipital spot may be present; head, pronotum, scutellum, legs and lateral and median portions of the abdominal sternites yellow; long elytral pubescence brunneous rather than pale. This subspecies agrees with the typical in other respects, including the male genitalia.

Range: California; Santa Clara county and Monterey area.

Holotype: male, CUPERTINO, SANTA CLARA CO., CALIFORNIA, June 11, 1939, K. S. Hagen [Calif. Acad. Sci.].

Allotype: female, same data [Calif. Acad. Sci.].

Paratypes: 4 males, 8 females. Los Gatos, Aug. 15, 1933, J. A. Kneche, 2 specs.; Los Gatos, June, 10, 14, A. Fenyes (each bears a yellow disc), 3 specs.; Pacific Grove, June, 16, '04, A. Fenyes (a blue disc), 2 spec.; Monterey, June 24, 1916, 81, 1 spec.; Monterey, July 15, 1923, L. S. Slevin, 1 spec.; Pacific Grove, Moonterey Co., Sept. 4 F. E. Blaisdell (a red rectangle), 1 spec.; Carmel, Monterey Co., June 21, 1915, L. S. Slevin, 1 spec.; Carmel, July 20, 1935, L. S. Slevin, 1 spec.; Monterey June 24, 1916, J. O. Martin, 1 spec.

The seven specimens from Santa Clara county show this subspecies at its best development, while specimens from the Monterey area depart less from the typical form, the melanic areas being of a lighter tone (brunneous). The Monterey area apparently is the point at which this subspecies intergrades with the

typical, since of the fourteen specimens of *perpallens* from Monterey county at hand for this study, seven, those mentioned above, are *perpallens sancataeclarae,* while the remainder are typical *perpallens.* Typical *perpallens* has not yet been seen from north of Monterey Bay, nor has the new subspecies appeared in collections from the southern part of the range of the species.

Subgenus Cantharis L. s. str. 1758

This remains the largest group in Division II. While it might be broken into several sections, the species are so well connected as to preclude such subdivision at present. The species include *Cantharis rotundicollis* Say, 1825, *consors* Lec., 1851, *curtisii* Kby., 1837, the European *C. livida* L. and *rufa* L. which have been taken on the North Atlantic coast; *C. transmarina* Mots., 1859, *grandicollis* Lec., 1851, *fidelis* Lec., 1851, *oregona* Lec., 1866, *scopa* Lec., 1866, *alticola* Lec., 1881, *marginellis* Lec., 1851, *lecontei* Fall, 1936, *tuberculata* Lec., 1851, *loweri* Pic, 1906 (*decipiens* Horn, 1894), and probably *simpliunguis* Blatch., 1910 and *westwoodii* Kby., 1837. *C. vittata* Fab., 1801 remains unknown, not having been certainly identified by any worker since its description. Its exact position is therefore uncertain. The first five species listed above are not difficult to recognize and a partial key covering these species is herein included, while most of the remainder defy analysis at present. The author has at hand several readily recognizable new species in this complex, to nearly all of the names more than one species being referrable. There are also some points of synonymy in question. Revision of this complex group is deferred to a later study. In this group the posterior claw of each pair is invariably simple while the anterior varies from lamellate to simple. The arrangement of the claws, however, usually holds to a rather definite formula. In most species the anterior claw of the protarsi is mostly broadly toothed, often lamellate (Fig. 20), and the anterior meso- and metatarsal claws are successively less broadly toothed. The ungual teeth are less broad in the females (Fig. 19), even being lacking on the meso- and metatarsi of some species (*alticola* group) and on all feet in at least one species (an undescribed species from the Midwest). *Simpliunguis* apparently is of this type. The male genital armature has the ventral lobes strong, slender and uncomplicated, the dorsal plate emarginate to bilobed.

C. loweri Pic (*decipiens* Horn), placed by Horn with *dentiger* Lec., has the ungual formation rather of *Cantharis.* (It appears

to be a variety of *oregona*.) According to Mr. J. W. Green, who examined Horn's types, two males, the anterior claws of the pro- and mesotarsi are lamellate, the posterior simple, while the metatarsal claws are missing in both specimens (in litt.).

On the basis of the original description, it is unlikely that *C. westwoodii* Kby., 1837 is a synonyn of *curtisii* Kby., 1837 (*samouelli* Kby, 1837). *Curtisii* does not have the thorax transverse nor the legs dark. Horn (1876) recognized it as distinct from *curtisii*, while Leconte in his North American synopsis (1851) included it among his unknowns and in his U. S. synopsis (1881) failed to mention it at all, presumably because of the extreme northern locality of its capture (lat 65°). In the following key, *westwoodii* would key out to *livida* L. (*andersoni* Frost 1922):

1. Color predominantly pale or dusky 2
– Color predominantly black ..... (species not treated here)
2. Eyes small, pronotum nearly as broad as elytra 3
– Eyes large, pronotum appreciably narrower than elytra 4
3. Pronotum definitely transverse, anterior angles evident, color entirely pale; or legs, antennae and ventral segments dusky, a dark M-shaped spot on thorax; size moderate—9 mm. (Maine and Novia Scotia) ..... *rufa*
– Pronotum subquadrate or slightly transverse, in effect suborbicular, margin deeply convex anteriorly, the anterior angles evenly rounded, obscured; an occipital spot, tibiae and apical parts of hind femora and outer two-thirds of antennae black, elytra often dusky apically, size large—11-13 mm. (Massachusetts) ..... *livida*
4. Legs unicolorous, testaceous or dusky, (eastern U.S. and Canada), size moderate to large 5
– Knees, tibiae and tarsi piceous, elytra testaceous to dusky, ventral segments sometimes piceous, size very large—14-19 mm. (Western California, San Diego north to San Francisco Bay) ..... *consors*
5. Size large—12-14 mm., yellow, legs testaceous, ventral segments sometimes dusky, rarely piceous, elytra often dusky, male metatibiae produced in a spiniform process (Northeastern U.S. south to Virginia, west to Illinois and Minnesota) ..... *rotundicollis*
– Size moderate—10 mm., elytra and ventral segments regularly piceous, legs testaceous, tarsi sometimes dusky, metatibiae of male not produced (Extreme northern U.S. and Canada west to Minnesota and Peace R., B.C.) ..... *curtisii*

C. rufa L. has not been heretofore included in the North American fauna, being a rather common European species. There are no differences between N. A. and European captures.

North American localities: Maine; Millinocket, June 25, 1930, 2 specs.; June 28, 1930, Siepmann, 1 spec.; Lincoln Co., June 22, 1940 and June 18, 1946, D. J. Borror, 3 spec.; Medomak, June 9, 1938, 2 specs.: Nova Scotia; Truro, June 18, 1915, 1 spec.; Middleton, June 22, 1914, W. E. E., 1 spec.

Subgenus Absidia Muls.

Two species, *C. insipida* Fall, 1907, and *C. sierrae* herein described, are provisionally placed in this subgenus. *Insipida* is evidently related to the new species and, by comparison with European material, these species were found to be quite near *Absidia pilosa* Payk. and *A. prolixa* Mark., the only representatives at hand. In addition to the key characters, they agree with European material in the head being rather long behind the eyes and in the obsolete inner angle of the maxillary palpi (Reitter 1911), as well as in the form of the genitalia. The Cantharidae section of the Junk *Coleopterorum Catalogus* (1939) gives *Absidia* subgeneric rank under the genus *Podistra*, but for the present the author prefers to retain this group in the genus *Cantharis*, leaving the study of the generic position for later treatment.

Cantharis (Absidia) sierrae McKey-Fender, n. sp.

Male: Form slender, length 6.5 mm., width at base of elytra 1.5 mm., antennae 4 mm. Elytra, ventral segments, antennae except basal segment, sides of head and tarsi piceous, thorax and scutellum yellow, otherwise dusky. Clypeus short, anterior margin biarcuate, surface of head shining, vertex closely punctured; antennae less than two-thirds body length, moderately stout, first and third antennal segments subequal, second approximately one-third the length of the third; eyes large, separated by a distance very slightly greater than the length of the eye, width of head including eyes slightly less than the width of the thorax. Thorax subtransverse, anterior margin very shallowly convex medially, anterior angles indistinct, uniformly rounded into front and sides, hind angles distinct, approximately right angles, posterior margin very gently convex, plain, sides slightly wider anteriorly, sinuate, slightly constricted just behind anterior angles and again just before posterior angles, edges reflexed; disc shining, virtually impunctate except very finely punctate anteriorly, disc tumid either side posteriorly, broadly impressed at anterior angles, a moderate impressed line between the convexities, pubescence fine and scattered, testaceous. Elytra moderately slender, combined width about one and one-half times width of the thorax, scabrously sculptured, longitudinal lines evident, edges a little thickened, pubescence suberect, rather sparse, dusky-testaceous. Last sternite broadly,

moderately emarginate, floor of emargination simple, apparent eighth sternite narrow, scarcely covering aedeagus. Tarsi slender, claws simple, only slightly expanded at base.

Genitalia feebly chitinized, median hooks articulated on dorsal face of median lobe, directed dorsad, meeting at center of anterior edge of dorsal plate and on the same level; space between ventral lobes wide and deep exposing most of median lobe, basal plates feebly developed, lateral sinuations undeveloped (Fig 9).

Female: Unknown.

Type locality: CALIFORNIA, LAKE ARROWHEAD.

Holotype: male, Lake Arrowhead, July 3, 1941, G. P. Mackenzie [Calif. Acad. Sci.].

Paratype: male, Keen Camp, June 14, 1946, D. J. and J. N. Knull.

The paratype is quite dark, the elytra and antennae except basal segment being deep black and legs except femora and trochanters of pro- and mesotarsi piceous, elytral pubescence dusky. In general body proportions, shape and sculpture of thorax, length and thickness of antennae it agrees well with the type.

CANTHARIS (ABSIDIA) INSIPIDIA FALL

Telephorus insipidus Fall (w. Cockerell), 1907, The Coleoptera of New Mexico, Trans. Am. Ent. Soc. 33: 235.

Two specimens of a species provisionally determined as *C. insipida* Fall are at hand. This species differs *C. (A.) sierrae* n. sp. in its paler, more uniform coloration and is more slender and with longer antennae. The length of the distal antennal segments is over five times their width against a length less than four times the width in *sierrae*, while the antennal length is but slightly less than the total length of the insect (less than two-thirds the total length in *sierrae*). The thorax is longer than wide with more deeply convex anterior margin, sides equidistant (wider anteriorly in *sierrae*), and the longitudinal sculptured lines of the elytra are a little less evident. These points all agree with Fall's description of *insipida*. What casts doubt on this species truly being Fall's species is the great disparity in measurements. One of the California specimens is only 5 mm. long and the other only 6.5, while the type of *insipida* is 9.5 mm. However, it is not uncommon in *Cantharis* for individuals of a species to vary widely in size (v. ant., *C. divisa*). The species at hand is dusky testaceous throughout, as is *insipida*, but the elytra, antennae and tarsi are darkest, the elytral apices approaching piceous. The second antennal segment is scarcely one-third the length of the third (barely

half as long as three in *C. insipida* Fall). In spite of these differences the author does not wish to erect a new species on the basis of only two specimens and without checking the Fall type.

Specimens examined: California, Lake Arrowhead, July 6, 1941, G. P. Mackenzie; Forest Home, San Bernardino Co., June 14, 1928, Van Dyke.

Type locality of *C. insipida* Fall—New Mexico.

The male genitalia of the species examined by the author differ in no tangible characters in the dried specimens available. They are of a very simple, weakly sclerotized type and only from relaxed and cleared specimens can a satisfactory study of such types be made. These species appear to be very rare, only four specimens having come to light in the thousands of *Cantharis* seen by the author.

Though five specimens (including Fall's type) scarcely offer room for speculation, the fact that all five are males is interesting. The female of the European *A. prolixa* Mark. is said to have the elytra much abbreviated.

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ACADEMY RECEIVES FLEA COLLECTION

Dr. C. Andresen Hubbard of Tigard, Oregon, well known for his exhaustive work "The Fleas of Western North America," has made up a series of twenty depository collections of fleas of the Pacific Northwest. These have been very generously presented to various museums in this country and abroad. In addition, a master collection is deposited in the U. S. National Museum.

The collection recently received by the California Academy of Sciences is second in completeness only to that of the U. S. National Museum. It comprises 108 slides, each usually with a male and female, of 108 species or subspecies of fleas from the Western States. Included are paratypes of sixteen species or subspecies described by Hubbard. The collection is a model of neatness, completeness and uniformity of labelling, and of good preparation.

The collection will be permanently maintained as a separate unit and will be available to qualified students visiting the Academy.—E. S. Ross.

Book Notices

The Life of William T. Davis. By Mabel Abbott. Cornell University Press, Ithaca, New York, xv + 321 pp., frontispiece and 18 figs. 1949. $3.50.

In this day, in which it is commonly thought that money alone will buy the "fuller life," this book should be widely read. The life of William T. Davis was simple, but full of the high adventure and deep pleasure available to anyone who cares to examine and study the natural history marvels of his immediate environment. Davis' environment, Staten Island, New York, can in effect, be duplicated by almost any suburban area of this country and his full life can readily be emulated by others.

Davis' work on the cicadas gave him his widest reputation and we thus tend to claim him as an entomologist. A story of his life, however, cannot be strictly entomological for he was a naturalist in the broad sense. Nevertheless this book is recommended reading for entomologists, especially those who have become so involved in the laboratory and economic phases of the science that they can no longer be called naturalists.

The book is skillfully and entertainingly written. Its pages carry frequent, well selected excerpts from Davis' "Natural History Note Book" which give the reader a keen insight into his character and personality. A complete list of Davis' published writings at the end of the book will be most useful.—E. S. Ross.

The Siphonaptera of Canada. By George P. Holland, Publication 817, Tech. Bul. 70, Canada Dept. Agric., Ottawa. 306 pp., including 42 pls. of 350 figs., 44 maps, September, 1949.

This paper is well planned, ably written, fully illustrated, and nicely printed. The clarity and uniformity of treatment show that much thought has been given to making it easily used by readers. The tabulations, maps, documentation, and index are excellent for quick reference.

The first 52 pages include a checklist and distribution by provinces, notes on life history and ecology, host specificity, geographical distribution, relationships of nearctic and palaearctic fleas, economic importance of fleas in Canada, and their anatomy as applied to systematics. A key to the genera is given on pp. 53-57, and keys to the species in the text (pp. 59-182). Maps show distributional records, often superimposed on the ranges of the hosts. Pages 183-195 give a host-flea index.—Hugh B. Leech.

UNDESCRIBED SPECIES OF TIPULIDAE FROM THE WESTERN UNITED STATES Part IV

(Diptera)

BY CHARLES P. ALEXANDER

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The preceding part under this title was published in the Pan-Pacific Entomologist, 23: 91-96; 1947. The species discussed herewith are all from California and Oregon and were collected by Mr. Kenneth M. Fender and the writer, chiefly during 1948. The types of the species are preserved in my collection. My deepest thanks and appreciation are extended to Mr. Fender for his most enthusiastic and successful efforts to make known the rich Tipulid fauna of Oregon.

Dicranoptycha melampygia Alexander, new species

General coloration dark gray, including the pleura; praescutum with four poorly defined darker stripes; tips of the femora and tibiae darkened; wings brownish yellow, the prearcular and costal fields a little clearer yellow; abdomen, including hypopygium, brownish black; outer dististyle of male hypopygium gradually narrowed into a slender apical spine, the outer margin of style with numerous strong spines extending almost to the base.

Male. Length about 8.5-9 mm.; wing 8-8.5 mm.

Rostrum black, pruinose; palpi black. Antennal scape and pedicel obscure yellow, flagellum black. Head uniformly dark gray.

Thorax dark gray, the praescutum with four darker stripes, the intermediate pair more distinct; posterior sclerites of notum and the entire pleura clearer gray. Halteres with stem yellow, knob weakly infuscated. Legs with coxae yellow, the fore pair a trifle darker; trochanters yellow; femora yellow basally, with about the outer third more darkened, gradually becoming brownish black; tibiae pale brown, the tip narrowly darkened, the base less evidently so; tarsi passing into black. Wings weakly brownish yellow, the prearcular and costal fields a little clearer yellow; veins pale brown, the trichia darker brown; costal fringe of male relatively long and dense. Venation: Sc1 ending just beyond level of fork of Rs, Sc2 near its tip; Rs slightly less than twice the basal section of R4+5; m-cu about two-thirds its length beyond the fork of M.

Abdomen, including hypopygium, brownish black. Male hypopygium with the tergal arms of moderate length, the flange on the concave margin back from the acute tip relatively short, only about one-third the total length of the arm. Outer dististyle grad-

ually narrowed into a slender apical spine, the outer margin with numerous strong spines that extend almost to the base. Inner dististyle entirely darkened, its apex obtusely rounded. Phallosome without conspicuous projections, the general outline obtuse.

Holotype, ♂ PRAIRIE CREEK STATE PARK, HUMBOLDT CO., CALIFORNIA, August 11, 1948 (C. P. Alexander). *Paratypes*, ♂ ♀, Peavine Ridge, Yamhill Co., Oregon, July 12, 1945, July 3, 1946 (K. M. Fender): ♂, Zena, Eola Hills, Polk Co., Oregon, June 5, 1948 (K. M. Fender).

The only generally similar regional species is *Dicranoptycha nigrogenualis* Alexander, which differs in the coloration of the wings and legs, and in the structure of the male hypopygium, particularly of the outer dististyle and phallosome.

Dicranoptycha stenophallus Alexander, new species

Thoracic dorsum almost uniformly gray, the praescutal stripes virtually lacking, the sternopleurite paler; wings with a brownish tinge; costal fringe of male short but dense; abdominal tergites brown, the subterminal segments scarcely more darkened, hypopygium yellow; male hypopygium with the outer dististyle relatively short and stout; aedeagus unusually small and slender, smooth, the tip decurved.

Male. Length about 8-10 mm.; wing 8-10 mm. *Female*. Length about 11-12 mm.; wing 9.5-10 mm.

Rostrum dark brown; palpi black. Antennae with the scape and pedicel yellow, flagellum black; flagellar segments cylindrical, shorter than the verticils. Head gray.

Thoracic dorsum almost uniformly gray, the praescutal stripes lacking or very indistinct. Pleurotergite and dorsal pleurites light gray, the latter with a short brown mark on the ventral anepisternum; ventral pleurites, especially the sternopleurite, paling to brownish yellow, sparsely pruinose. Halteres yellow, knob infuscated. Legs with the coxae yellow, pruinose; trochanters yellow; remainder of legs obscure yellow, the outer tarsal segments darkened. Wings with a brownish tinge, the costal border slightly more saturated, brownish yellow; veins pale brown. Costal fringe of male short but dense. Venation: Rs a little longer than cell 1st M2; m-cu one-half to two-thirds its length beyond fork of M.

Abdominal tergites brown, the sternites a little paler, the subterminal segments slightly to scarcely darker; hypopygium yellow. Male hypopygium with the tergal arms pale, unusually long and slender, the tips acute and microscopically roughened. Outer dististyle relatively short and stout, the apical spine moderately long; spines of outer margin subappressed but conspicuous, including approximately the distal two-thirds, weak to obsolete on

the lower face of style. Inner dististyle flattened, the tip obtuse; surface, and especially the lower margin, with long pale setae, the longest only a little shorter than the diameter of the style. Phallosome distinctive, including an oval central structure and a low, weakly divided lobe with several pale punctures; aedeagus small but elongated and slender, smooth, the decurved tip pale.

Holotype. ♂, Madrona Camp, Siskiyou National Forest, Del Norte Co., California, August 1, 1946 (C. P. Alexander). *Allotype.* ♀. Little Phillips Creek, above Elgin, Blue Mts., Umatilla Co., Oregon, 2850 ft., July 2, 1948 (C. P. Alexander). *Paratypes,* ♂, with the allotype: ♂ ♀, Langdon Lake, Blue Mts., Umatilla Co., Oregon, 4995 ft., August 17, 1948 (C. P. Alexander); ♂ ♀, Peavine Ridge, Coast Range, Yamhill Co., Oregon, Stations 1, 2 and 3, July 11-12, 1945, May 20, June 20, July 3, August 13-20, and September 13, 1946; July 3, 1947; July 16, 1948 (K. M. Fender); Humbug Mountain State Park, Curry Co., Oregon, August 11, 1948 (K. M. Fender); State Line Creek, Curry Co., Oregon, August 9, 1948 (Alexander & Fender); Castle Crags State Park, Shasta Co., California, 2050 ft., August 13, 1948 (C. P. Alexander).

While similar in its general appearance to species such as *Dicranoptycha occidentalis* Alexander and *D. spinosissima,* new species, the present fly is quite distinct in the structure of the male hypopygium, as described.

Dicranoptycha spinosissima Alexander, new species

General coloration of head and thorax gray, the praescutum with two poorly indicated brown stripes; legs yellow, the outer tarsal segments brownish black; wings narrow, yellowish gray, costal fringe of male long; abdomen brown, the subterminal segments brownish black; male hypopygium with the lateral tergal arms unusually slender; outer dististyle long and slender, at tip narrowed into a black spine, the outer surface of apical third with microscopic spines; apex of inner dististyle obliquely truncated; phallosome produced into two slender rods that are expanded into pale membrane densely set with minute spinous points.

Male. Length about 9-10 mm.; wing 9 x 2 mm. *Female.* Length about 10 mm.; wing 10 mm.

Rostrum gray; palpi black. Antennae with the scape infuscated, pruinose, pale at outer end; pedicel yellow, flagellum black; flagellar segments cylindrical, shorter than the verticils. Head light gray.

Pronotum gray, the scutellum more obscure yellow. Mesonotum gray, the praescutum with faint indications of two pale brown intermediate stripes; humeral region paler gray, enclosing the

black pseudosutural foveae. Pleura gray, the dorsal pleurites darker than the ventral sternopleurite; dorsopleural membrane buffy. Halteres pale brown, the base of stem yellow. Legs with the coxae yellow, the fore and middle pairs slightly more pruinose; remainder of legs yellow, the outer tarsal segments brownish black. Wings narrow, tinged with grayish yellow, the prearcular and costal fields slightly clearer yellow; veins pale brown. Costal fringe of male relatively long and conspicuous. Venation: Rs shorter than cell 1st M2; -cu gently sinuous, at near one-third the length of cell 1st M2.

Abdomen brown, the subterminal segments deepening to brownish black; hypopygium obscure yellow. Male hypopygium with the lateral lobes of the tergites low and tumid, the tergal arms unusually slender, their tips paling into membrane. Outer dististyle unusually long and slender, the tip abruptly narrowed into a straight black spine, the outer surface of the apical third with microscopic suberect to appressed spinulae. Inner dististyle shorter, the tip obliquely truncate. Phallosome distinctive, at apex produced into two slender rods that expand into pale membrane that is densely set with acute spinous points, these directed clockwise, those of the inner edge being directed outward, those of the outer margin more retrorse.

Holotype, ♂, HATCHET PASS, near Burney, SHASTA CO., CALIFORNIA, 4000 ft., July 9, 1947 (C. P. Alexander). *Allotype*, ♀, Little Phillips Creek, above Elgin, Blue Mts., Umatilla Co., Oregon, 2850 ft., July 2, 1948 (C. P. Alexander). *Paratype*, ♂, with allotype.

The most similar regional species are *Dicranoptycha occidentalis* Alexander and *D. stenophallus*, new species, which, while generally similar in appearance, differ very conspicuously in the structure of the male hypopygium.

Limnophila amabilis Alexander, new species

Praescutum gray pruinose, with a narrow black median stripe; basal two segments of antennae blackened, the flagellum with the more basal segments brownish yellow; halteres yellow; legs yellow, the femoral tips and tibial bases and tips blackened; wings pale yellow with a heavy brown spotted pattern; abdomen black; male hypopygium with the outer dististyle dilated at base, gradually narrowed into a long apical spine, before midlength on ventral side bearing a lateral tooth or flange, the style entirely glabrous.

Male. Length about 7-7.5 mm.; wing 6.5-7 mm.; antenna about 1.2 mm. *Female*. Length about 9-10 mm.; wing 8-8.5 mm.

Rostrum black, grayish pruinose; palpi black. Antennae short; scape black, pedicel brownish black, flagellum brownish yellow, the outer segments darker; basal flagellar segments subglobular to short-oval, with short verticils; outer segments more elongate,

more or less dilated at near midlength where they bear long conspicuous verticils. Head dark, more pruinose on front and orbits.

Pronotum brownish black, pruinose. Mesonotal praescutum grayish pruinose, with a narrow but conspicuous black median stripe, narrowed behind; pseudosutural foveae black, relatively large. Pleura black, sparsely pruinose; dorsopleural membrane dusky. Halteres pale yellow. Legs with the coxae black, sparsely pruinose; trochanters obscure yellow; femora light yellow, the tips abruptly blackened, the amount subequal on all legs and involving about the distal eighth; tibiae yellow, the extreme base and slightly broader apex black; basal three tarsal segments yellow, the tips narrowly darkened; outer two tarsal segments brownish black; tibial spurs black. Wings pale yellow, the costal region clearer yellow; a heavy brown spotted pattern, arranged much as in certain species of *Elaeophila*, the markings restricted to the vicinity of the veins, as follows: Arculus; origin of Rs; midway between the two latter; a more or less developed spot on Rs; cord and outer end of cell 1st M2; fork of M1+2; and as a series of marginal spots, largest over Sc and at the wing tip where the individual spots tend to become confluent; paler brown washes in cells M, Cu and the Anals; axilla narrowly darkened; veins brown, yellow in the clearer yellow parts. Venation: Sc1 ending about opposite the fork of Rs, Sc2 at its tip; Rs long, angulated and slightly spurred at origin; inner ends of cells R4, R5 and 1st M2 in approximate transverse alignment; R2+3+4 subequal to basal section of R5; vein R2+3 perpendicular at origin, with a short spur at the bend; cell M1 subequal to or shorter than its petiole; M-cu at from one-third to midlength of cell 1st M2; anterior arculus preserved.

Abdomen, including hypopygium, black. Male hypopygium with the central region of the tergite only moderately produced. Basistyle unarmed. Dististyles terminal in position, the outer dilated at base, gradually narrowed into a long slender apical spine, before midlength on ventral side bearing a lateral tooth or flange, the style entirely glabrous. Inner dististyle broadly flattened, dark colored. Aedeagus long, provided with a subtending flange. Gonapophyses appearing as simple flattened clubs.

Holotype, ♂, HATCHET PASS, near Burney, SHASTA CO., CALIFORNIA, 4000 ft., July 9, 1947 (C. P. Alexander). *Allotopotype*, ♀. *Paratopotypes*, 4♂ ♀,

This unusually beautiful and distinct fly is named for Mrs. Charles P. Alexander, using the Latinization of her given name, Mabel. While superficially resembling some species of the subgenus *Elaeophila*, especially in the wing pattern, the fly is entirely distinct from all other members of the genus *Limnophila* so far described. Of the various subgenera the species fits most nearly into Phylidorea but from the basic plan of the male hypopygium can scarcely be placed therein.

THE DIPTERA COLLECTED ON THE COCKERELL AND HUBBELL EXPEDITIONS TO HONDURAS

Part I: STRATIOMYIDAE, TABANIDAE, AND ACROCERATIDAE[1]

BY MAURICE T. JAMES

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During the winter of 1946-47, Professor and Mrs. T. D. A. Cockerell visited the Escuela Agricola Panamericana, Zamorano, Honduras, for the purpose of studying the insect fauna. Through their own efforts and those of students of the school, whom they interested in the project, they collected widely in the various orders. The present paper is based on a part of their Diptera, augmented by collections which T. H. Hubbell sent me for study. Dr. Hubbell visited various areas in Honduras in 1923, and in 1948 he revisited that country, on which occasion some time was spent at Zamorano.

STRATIOMYIDAE

Hoplitimyia mutabilis (Fabricius), 1787, Mantissa Insectorum, vol. 2, p. 331 (*Stratiomys*). Zamorano, thicket, 2650 ft., July 29, 1948 (T. H. Hubbell), no. 162, 1 female; Dept. Choluteca, 3776 ft., El Chinchayote, Sa. de Colón, E. of San Francisco, July 31, 1948 (Hubbell).

Hermetia illucens (Linnaeus), 1758, Systema Naturae, 10th ed., p. 589 (*Musca*). Zamorano, November, 1946 (Vidales), Nov. 23, 1946 (G. Cisneros), and Aug. 6 and 22, 1948 (Hubbell), 5 females; Tela, Lancetilla, July 28, 1948 (Hubbell), 1 female.

Hermetia flavipes Wiedemann, Aussereuropaische Zweiflügelige Insekten, 1830, vol. 2, p. 26. Tela, Guaimas Dist., May 2, 1923 (Hubbell), no. 442, 1 male.

Hermetia albitarsis Fabricius, 1805, Systema Antliatorum, p. 63. Tela, Lancetilla Creek, March 11, 1923 (Hubbell), 1 female; Tela, Lancetilla, July 28, 1948 (Hubbell), 1 specimen, damaged.

Chrysochlorina varia (Curran), 1929, Amer. Mus. Novitates, no. 339, 1 p. 3 (*Chrysochlora*). Ridge between La Montañita and

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[1]I am grateful to Dr. Cornelius B. Philip for reviewing the Tabanidae section of this paper and for making some valuable suggestions on it.

C. Uyuca, about 5 kilometers southwest of Suyapa, Morazán Dept., 5200 to 5400 ft., Aug. 5, 1948 (Hubbell), no. 195, 1 female; Mt. Caculatepe, 4200 to 4500 ft., Aug. 6, 1948 (Hubbell), no. 203, 1 female.

Sargus thoracicus Macquart, 1834, Histoire Naturelle des Diptères, vol. 1, p. 261. Zamorano, 2600 ft., at light, July 3, 1948 (Hubbell), no. 19, 1 female.

Sargus speciosus Macquart, 1846, Diptères Exotiques, suppl. 1, p. 56. Zamorano, 2600 ft., at light, July 3, 1948 (Hubbell), no. 19, 1 female.

Pedicella notata (Wiedemann), 1830, Aussereuropaische Zweiflügelige Insekten, vol. 2, p. 34 (*Sargus*). Zamorano, Oct. 26, 1946 (Cisneros), 1 female.

Merosargus cingulatus Schiner, 1868, Novara Reise, Diptera, p. 62. Zamorano, October, 1946, (A. Carr), Nov. 18, 1946 (A. A. Arca), July 15, 1948 (Hubbell), no. 79, and Dec. 17, 1946, 4 females; Tela, Lancetilla, July 28, 1948 (Hubbell), 1 female; Tela, Dakota Farm, May 17, 1923 (Hubbell), no. 515, 1 specimen, damaged; Rio Sangrelaya, April 19, 1923 (Hubbell), no. 312, 1 female (?), damaged.

Merosargus bequaerti Curran, 1928, *in* Gowdey, Ent. Bull. Dept. Agric. Jamaica, 4, p. 31. Tela, Lancetilla, July 28, 1948 (Hubbell), 1 female.

Microchrysa bicolor (Wiedemann), 1830, Aussereuropaische Zweiflügelige Insekten, vol. 2, p. 41 (*Sargus*). Tela, May 31, 1923 (Hubbell), no. 694, 1 female.

Ptecticus testaceus (Fabricius), 1805, Systema Antilatorum, p. 257, 6 (*Sargus*). Zamorano, 2600 ft., on citrus, Aug. 16, 1948 (Hubbell), no. 225.

Tabanidae

Assipala melanoptera (Hine), 1905, Ohio Nat., 6: 391 (*Chrysops*). Tela, April 6, 1923 (Hubbell), no. 187, 3 females; Tela, La Fragua Farm, March 8, 1923 (Hubbell), 2 females; Rio Paulaya, Barranco, April 17, 1923 (Hubbell), no. 303, 1 female.

Esenbeckia mejiai Fairchild, 1942, *Ann. Ent. Soc. Amer.* 35: 198. The male is previously undescribed. It differs from the female as follows.

Male. Eyes broadly contiguous, the ocellar triangle in consequence more pronounced and more distinctly elevated than in the female. Proboscis, to base of labella, about 1.25 times head height;

labella about 0.12 length of haustellum, slightly inflated, elongated-oval, and rounded at apex. Antenna as in female, the terminal segment of flagellum somewhat narrower than in Fairchild's drawing, the length in proportion to the basal and subapical widths respectively 11:1 and 15:1. Palpus with basal segment (Fig. 1) strongly inflated, more hairy than in female, with particularly long hairs below; apical segment more slender than in female. Pile of thorax and abdomen somewhat more pronounced than in female.

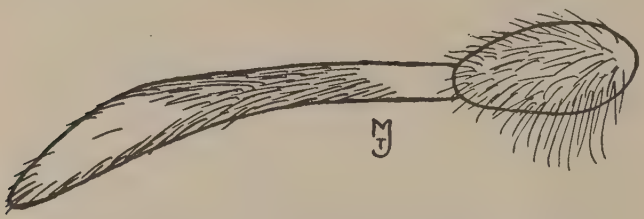

Fig. 1. *Esenbeckia mejiai* Fairchild, palpus of male.

Described from three males, Agua Amarilla, Honduras, Dec. 1, 1946 (Cisneros) and Dec. 15, 1946. Comparison made with one female, in good condition except for loss of the antennal flagellum, Agua Amarilla, Dec. 15, 1946.

Chrysops scalarata Bellardi, 1859, Saggio di Ditterologia Messicana, pt. 1, p. 72. Palajas, near Agua Azul, brushy slope, Lake Yojoa, Dept. Cortés, Aug. 14, 1948 (Hubbell), No. 217, 1 female (det. Philip).

Dichelacera pulchra Williston, 1900, Biologia Centrali-Americana, Vol. I, suppl., p. 263. Zamorano, October, 1946 (A. Carr), 2 females.

Dichelacera fulminea (Hine), 1920, Ohio Jour. Sci., 20:187 (*Tabanus*). Dept. Cortés, Palajas, near Agua Azul, east side Lake Yojoa, Aug. 14, 1948, (Hubbell), No. 212, 1 female.

Lepiselaga crassipes (Fabricius), 1805, Systema Antliatorum, p. 108 (*Haematopota*). Rio Claura, April 13, 1923 (Hubbell), No. 259, 1 female; Tela, May 9, 1923 (Hubbell), No. 499, and May 2, 1923 (Hubbell), No. 440, 2 females.

Diachlorus ferrugatus (Fabricius), 1805, Systema Antliatorum, p. 111 (*Chrysops*). Tela, May 31, 1923 (Hubbell) No. 696, 1 female.

Hybomitra quadripunctata var. *amabilis* (Walker), 1848, List of . . . Dipterous Insects in the . . . British Museum, pt. 1, p. 154 *(Tabanus)*. Zamorano, March 30, 1946 (M. Morales), 1 female.

Tabanus lineola var. *carneus* Bellardi, 1859, Saggio di Ditterologia Messicana, pt. 1, p. 62. Zamorano, Oct. 12 (G. Vidales) and Oct. 13, 1946 (L. O. Williams), 2 females.

Tabanus unistriatus Hine, 1906, Ohio Naturalist, 7:28. Tela, Jilamo farm, May 28, 1923 (Hubbell), No. 654, 1 female (det. Philip).

Stenotabanus longipennis Kröber, 1930, Encyclopédie Ent., B, Diptera, V (1929), p. 127. Ruinas de Copán, 3500 ft., Dept. Copán, Aug. 4, 1948 (Hubbell), No. 191, 1 female (det. Philip).

Amphichlorops sp. near *venenatus* (Osten Sacken). Palajas, near Agua Azul, east side of Lake Yojoa, Aug. 14, 1948 (Hubbell), No. 212, 1 teneral male (det. Philip).

Hine (1925, Occ. Papers Mus. Zool. Univ. Michigan, no. 162, pp. 1-35), has recorded the following species on the basis of specimens obtained by the Hubbell expedition of 1923.

Esenbeckia prasiniventris (Macquart) (recorded as *Pangonius*)—Progresso.

Scione aurulans (Wiedemann)—Progresso; Tela.

Chrysops scalarata Bellardi (recorded as *C. lateralis* Wiedemann, misidentification; cf. Fairchild, 1946, Ann. Ent. Soc. Amer., 39: 565)—Tela.

Chrysops latifasciatus Ballardi—Tela.

Tabanus claurensis Hine—Rio Claura.

Tabanus unipunctatus Bigot (recorded as *T. jilamensis* Hine; synonymy fide Philip, from Hine's manuscript notes).

Tabanus unistriatus Hine—Tela.

Tabanus subruber Bellardi—Tela.

Tabanus bigoti Bellardi—Tela.

Leucotabanus leucaspis (Wiedemann) (recorded as *Tabanus*) —Tela.

Acroceratidae

Ocnaea cisnerosi James, new species

Male. Vertex black, shining laterally, dulled by greyish pollen between the two rather large yellow ocelli; front about 1.5 as

long as the diameter of an ocellus, brownish, shining, becoming yellowish next to base of antennae; short facial triangle and most of occiput yellowish, with concolorous pollen. Eyes black, with rather dense hairs which are mostly as long as the first antennal segment and which range from blackish above to yellow below. Pile of vertex and occiput concolorous. Antennae yellow on scape, somewhat darkened on pedicel, distinctly blackish on flagellum, especially on outward surface; ratio of segments 9:4:95, comparable head height 75; flagellum curved, about as broad on basal third or two-fifths as pedicel, thence tapering to a narrowed though blunt apex; antennae bare except for a prominent tuft of yellow hairs dorsally on the pedicel. Proboscis almost completely obscured by lower part of head; pile yellow.

Thorax mostly yellow; three broad brownish stripes on mesonotum, the lateral ones abbreviated anteriorly, the median one reaching the anterior margin but stopping short of the scutellum; most of sternopleura and lower part of pteropleura brownish, bare; thorax otherwise mostly clothed with yellowish pile. Legs yellow, the femora and tibiae brownish-yellow; pile yellow. Wings hyaline; vein R_{4+5} furcate, the branches forming practically a right angle at the fork and both reaching the wing margin; cell R_5 broadly open.

Abdomen yellow; broad posterior margins of terga, especially laterally, brownish.

Length, 11-12 mm.

Holotype, male, Zamorano, Honduras, Dec. 9, 1946 (G. Cisneros); State College of Washington Type Coll. No. 169. Paratype, male, Zamorano, Honduras, Feb. 26, 1947 (Archie Carr).

In Aldrich's key (Proc. U. S. Nat. Mus., 81 (9) : 3, 1932) this species runs to *auripilosa* Johnson or, if the femora are considered as infuscated, to *trivittata* Aldrich. The lack of black abdominal markings will easily distinguish it from both those species. Other color characters, particularly the black thoracic stripes, will further distinguish *trivittata,* also described from Honduras. *O. micans* Erichson, in which the abdomen is wholly "fuscous" or "testaceus", is described as having a clavate flagellum. The two North American species which have been described subsequent to the publication of Aldrich's key, namely *O. smithi* Jenks and *O. sequoia* Sabrosky (cf. Sabrosky, Amer. Midl. Nat., 39:385-387, 1948), both have the thorax shining black and the abdomen marked with black or bluish-black.

A NEW SPECIES OF ERIBOLUS FROM CALIFORNIA

(Diptera, Chloropidae)

BY CURTIS W. SABROSKY

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A revision of *Elachiptera* and related genera, including *Eribolus* Becker, was recently published by the writer (1948, Jour. Wash. Acad. Sci. 38(11): 365-382) with a key to the Nearctic species. Since then several specimens of both sexes of a new species of *Eribolus* have been discovered. The species is an interesting example of the difficulty often observed in Chloropidae, of finding consistent characters to separate groups of closely related species. Absence of the characteristic pair of well-developed fronto-orbital bristles and the slenderness of the arista would ordinarily have placed this species in *Oscinella* rather than in *Eribolus*, but the structure of the head and thorax, the chaetotaxy, and its close similarity to *E. nearcticus* Sabrosky all cause me to consider it as merely an aberrant *Eribolus*.

Eribolus californicus Sabrosky, new species

♂, ♀. Almost entirely black, the third antennal segment bright yellow in the male, but orange with narrow infuscation along dorsal and distal margins in the female, palpus yellow to orange, and halter knob bright yellow; entire head dark gray to leaden gray pollinose, the frontal triangle only weakly distinct from the front; mesonotum, scutellum, metanotum, and upper portions of meso- and pteropleuron gray pollinose, the lower half of pleuron smooth and polished black; abdomen rather shining, though sparsely and inconspicuously pollinose.

Front at vertex nearly half the width of head (0.46) and nearly as broad as long (0.86-0.90); frontal triangle three-fourths the length of front; length and height of head subequal; eye diagonal, the longest axis approximately 45° from vertical axis of head; cheek strongly slanting mesad, in profile its height only half the breadth of third antennal segment; arista slender, not thickened except for basal segment; no fronto-orbital hairs outstanding, though the middle hairs in the fronto-orbital row are

somewhat longer than the others. Mesonotum relatively smooth, with scarcely any obvious punctures and only minutely roughened on the flattened posterior slope; bristles moderate to short, not conspicuous, the posterior dorsocentrals especially weak; 1+1 notopleural; only the apical pair of scutellars evident, strong though short, erect, and black; subapicals pale, weak, and not appearing as distinct bristles. Second and third costal sectors subequal, the second barely longer (1.02-1.07 times). Length, 2 mm.

Holotype female, SAN DIEGO, CALIF., Nov. 18, 1916 (H. G. Dyar), U. S. National Museum, Type No. 59283. Allotype; Martinez, Calif., July 11, 1917 (J. M. Aldrich) [Malloch Colln.]. Paratypes: ♂, same data as allotype [Malloch Colln.]; ♀, San Simeon, Calif., Sept. 25, 1938 (M. Cazier) [Amer. Mus. Nat. Hist.].

The entirely black legs, with no color even at the knees, and the marked contrast between the entirely or predominantly yellow to orange third antennal segment and the black basal segments, easily distinguish this species from its congeners.

KEY TO THE FOUR NEARCTIC SPECIES OF ERIBOLUS

1. Legs predominantly bright yellow, including fore coxa, fore femur entirely or predominantly, and mid and hind femora basally; palpus yellow in male, more or less infuscated in female; eastern North America.....*E. longulus* (Loew)

–. Legs entirely or predominantly black, including fore coxa and all femora except sometimes knees narrowly; northern and western North America.....2

2. Antenna entirely black, or virtually so; palpus black in both sexes.....*E. sudeticus* Becker

–. Antenna entirely or in large part yellow to orange; palpus yellow to orange in both sexes.....3

3. Basal antennal segments black, contrasting strongly with the bright yellow to orange third segment; legs entirely black.....*E. californicus* Sabrosky

–. Basal antennal segments testaceous; legs with yellow tibiae and tarsi, at most the distal tarsal segments infuscated and the hind tibia with a median brown band.....*E. nearcticus* Sabrosky

A LONG LOST APHIS SPECIES

(Homoptera: Aphididae)

BY F. C. HOTTES

Grand Junction, Colorado

The writer recently had occasion to look up the works of John Curtis in *Index Litterature Entomologicae* by Horn and Schenkling. While doing so I came across the following citation, "On *Aphis borealis* from the Polar Sea. In Parry, Narrative of an Attempt to reach the North Pole. 1828. Appendix." Not having heard of an aphid species by that name an attempt was made to find it in aphid literature without success. A copy of the work by Parry was located in the Library of Congress and photostats of the title page and of page 201 on which *Aphis borealis* was described were obtained. The title as given by Horn and Schenkling, while highly descriptive, is theirs and not that of Parry or Curtis, for the species is described under the simple title "Insect", and one finds that it was the only insect taken during the voyage. The original description follows:

"Order, Hemiptera, Linn., &c. Omoptera, Leach.

Fam. Aphidae, Lat. Leach.
Genus, Aphis, Linn., &c.
A. Borealis, Curtis's MSS.

"Corpus magnum, atrum, hirsutum, femoribus basi ferrugineis: alis magnis, subfuscis, ad costam atris.

"At first sight this insect might be mistaken for *A. Piceae* of *Panzer*, which it resembles in size and colour. Upon a closer examination, however, it will be seen that the whole surface, excepting the wings, is covered with rather long and somewhat hoary tomentum or pubescence; and the base only of the thighs is ferruginous; whereas, in *A. Piceae*, the whole insect is naked, and the antennae, thighs, and tibiae are ferruginous or reddish at their base."

The circumstance of *Aphis borealis* having been found on floating floes of ice in the Polar Sea, at one hundred miles distance from the nearest known land, and as far north as 82¾°, renders it in a more than ordinary degree interesting.

Its very near resemblance to *Aphis piceae,* which feeds on the silver fir (*Pinus picea* Linn.), whence it derives its name, would induce the belief that the floating trees of fir, that are to be found so abundantly on the shores and to the northward of Spitzbergen, might possibly be the means by which this insect has been transported to the northern regions. It was never seen on the wing, and the few specimens that were obtained were in a very languid state, but revived by the heat of the hand. The last paragraph of observations was written by Parry.

Aphis borealis Curtis 1828 is most likely a synonym of the species *Schizolachnus pineti* (Fab.) which is the same species described by DeGeer as *Aphis* (*tomentosa*) *pini* and often incorrectly credited to him.

It is of interest to report that Elton (1925) records the finding of *Dilachus piceae* Panzer (now placed in the genus Cinara) in great numbers on the snow on Spitzbergen where the nearest land source is the Kola Peninsula of Russia some eight hundred miles away. Elton reports finding one aphid every thirty or forty yards and eighty percent of these were alive, on an eight mile trip.

References Cited

Elton, C.S. 1925. The Dispersal of Insects to Spitzbergen. Trans. Ent. Soc. London. pp. 289-299.

Parry, William Edward, Captain R. N., F. R. S. 1828. Narrative of an Attempt to Reach the North Pole, in boats fitted for the purpose, and attached to His Majesty's Ship Hecla, in the Year MDCCCXXVII. John Murray, Publisher to the Admiralty, and Board of Longitude. appendix p. 201.

CARTODERE FILUM IN CALIFORNIA

(Coleoptera: Lathridiidae)

Examples of this tiny elongate beetle were reared from a small log of California laurel (*Umbellularia californica* Nutt.), collected in the woods in Mill Valley, Marin Co., California. *C. filum* Aubé feeds on the spores of fungi, and is more commonly associated with human dwellings. Dr. E. C. Van Dyke has taken it from herbarium specimens in Berkeley, Calif.—H. B. Leech.

NEW DISTRIBUTION RECORDS FOR SOME NEARCTIC TABANIDAE

(Diptera)

BY WOODROW W. MIDDLEKAUFF[1] AND LARRY W. QUATE[2]

University of California, Berkeley

During the recent growth and reorganization of the family Tabanidae in the California Insect Survey collection at the University of California, a number of new records have come to light. The authors gratefully acknowledge the courteous assistance rendered by Dr. Cornelius B. Philip for identifying and confirming many of the following specimens. The new records are as follows:

Stonemyia pigra (O. S.). 1♀ Atlanta, Ga., 1 July, 1943. (W. Middlekauff).

Chrysops callida O.S. 1♀ Pryor Springs, Decatur, Ala., 9 June, 1941. (J. N. Belkin).

Chrysops celeris O.S. 1♀ Londonville, Ohio, 6 June, 1915.

Chrysops cuclux Whitney. 1♀ Plainfield, Vt., 23 June, 1941. (R. H. McCauley, Jr.).

Chrysops flavida flavida Wied. 3♀♀ Ship Island, Miss., 15 August, 1943.

Chrysops flavida reicherti Fairchild. 1♀ Pryor Springs, Decatur, Ala., 13 July, 1941. (J. N. Belkin).

Chrysops nigra Macquart. 1♀ Plainfield, Vt., 17 June, 1941. (R. H. McCauley, Jr.).

Hybomitra tetrica rubrilata (Philip). 1♀ White Mts., Ariz., 5 July, 1935.

Tabanus acutus (Bigot). 1♀ Biloxi, Miss., 3 September, 1943.

Tabanus endymion O.S. 1♀ Biloxi, Miss., 18 September, 1943.

Tabanus fulvulus pallidescens Philip. 1♀ Eagletown, Okla., 12 June, 1939. (Kaiser - Nailon).

Tabanus fuscicostatus Hine. 1♀ Broken Bow, Okla., 19 June, 1934. (J. Stankavich).

Tabanus gladiator Stone. 1♀ Biloxi, Miss., 3 September, 1943.

Tabanus molestus Say. 1♀ Camp Croft, S. C., 21 June, 1942. (W. W. Middlekauff).

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[2]Research Assistant, Division of Entomology and Parasitology.

Eagletown, Okla., 12 June, 1939. (Kaiser - Nailon).

Tabanus nigrescens nigrescens Palisot de Beauvois. 1♀ Pike Co., Mo., 2 July, 1945. (G. M. Dodge).

Tabanus vittiger schwardti Philip. 1♀. Urbana, Ill., 16 June, 1938. (G. T. Riegel).

Tabanus vittiger schwardti Philip. 1♀, 1♂. Urbana, Ill., 16 June, 1938.
9 September, 1938. (G. T. Riegel).

Book Notice

Insects Affecting Forest Products and Other Materials. By W. J. Chamberlin. Oregon State College Co-operative Assoc. Corvallis, Ore. 159 pp., 100 text figs. 1949. $2.75.

This Photo Offset publication is intended as an introductory work for students, woodsmen and others who wish to learn something about the more important insects and related organisms which attack the forests and forest products. The various groups are defined and selected examples discussed and well illustrated along with examples of their methods of work and types of injury. Emphasis is placed upon the economic phase of the subject and the various methods of control are dealt with. A fairly extensive bibliography of the more important works dealing with forest insects is given as well as a most useful index.

The work should serve as a useful guide and reference book for those who are interested in the forests, their protection, and the preservations of all such products as are derived from them.

—Edwin C. Van Dyke.